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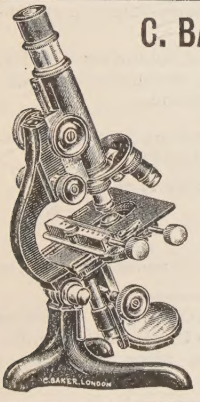

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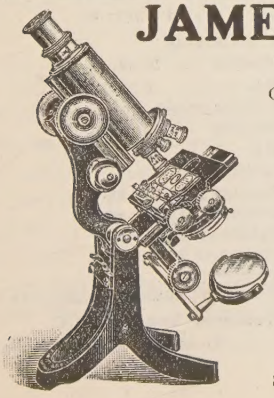

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TROPICAL DISEASES BULLETIN.

Vol. 7.] 1916. [No. 3.

TYPHUS.

MEREWETHER (Edward R. A.). **A Report on the Late Medical Conditions in Serbia, with Special Reference to the Typhus Epidemic.**—*Jl. R. Naval Med. Service*, 1916. Jan. Vol. 2. No. 1. pp. 58–64.

This interesting paper gives a general review of the conditions prevailing in Serbia under normal and war conditions. Some of the main points only can be noted here. Certain general conditions prevail. The summer is extremely dry and hot, the winter cold. Severe floods occur in the river valleys in spring, the breeding grounds thus provided for mosquitoes causing malaria to be endemic in the valleys. The equable distribution of the population and the lack of communication, which should limit epidemics, have been overcome by the flight of refugees, and the consequent overcrowding has favoured the development of epidemic diseases.

The standard of housing was fair, cleanliness of dwellings varied but the majority of dwellings were not clean. The people kept their bodies and under garments clean, but the outer garments were often filthy. Sanitary conveniences were extremely bad, often no attempt at disinfecting or disposing of excrement being made. The water supply was either from springs or from "typical examples of the worst kind of well." The supply of both hospitals and doctors was very inadequate.

The majority of infectious diseases were cases of typhus and relapsing fever, but some cases of enteric, variola, erysipelas and scarlet fever occurred. Except for typhus, relapsing fever caused more loss of time in the army than any other disease. No abnormal features were presented by relapsing fever patients, except there were a large number of cases in which acute suppurative parotitis developed as a complication. Erysipelas was slowly increasing. Cases of plague with 100 per cent. mortality have been reported from Salonica.

The typhus epidemic was very severe. No prodromal symptoms were noted. Severe headache was a constant feature. Prostration was marked. "Two early signs are bands of injection of the conjunctiva, extending from either canthus towards the cornea, and slight contraction of the pupil." The rash appeared on the 5th to 6th day as small, carmine petechiae. Toxaemia was marked during the second week. Towards the 12th day nearly every case seemed

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moribund. From then, either improvement or death ensued. Convalescence was rapid and relapses were rare. Local gangrene and suppurative parotitis were common complications. Otitis media and slight deafness also were frequent. Severe myocarditis was constant. The age of the patient was important for prognosis; those over 40 had little chance, and the case mortality progressively increased with each decade.

The treatment recommended consists in immediate going to bed, keeping perfectly flat, and undergoing no exertion. Fresh air and persistent hydrotherapy are necessary. The bowels must be kept open and all means adopted to keep the urine adequate in quantity and of a pale straw colour. In convalescence, the heart takes a long time to recover, and the shoulders of the patient should not even be raised until a week after the temperature has fallen to normal. Every care must be taken to prevent strain.

The spread of typhus in louse-infected communities was astoundingly rapid. From the number of cases among doctors and nurses, it is considered that there may be secondary channels of infection, and that "carriers" may be responsible for some cases.

Prophylactic measures are directed against lice. All clothing of patients, whether typhus cases or not, must be disinfected. The patients must be given antiseptic baths. Louse-proof clothing must be worn by all. This is "a cotton outer garment consisting of trousers, with socks for the feet, with a sleeved coat, the whole made in one piece and opening down the front. It should be closely tied at the wrists and neck, and the head should be covered with a cotton cap; nurses can wear their ordinary cotton dresses over these." Similar underwear to this should be worn by everybody. Railway carriages and public conveyances should be repeatedly disinfected. Formaldehyde vapour, except when very concentrated, is of little use against lice; sulphur dioxide is preferable. For personal application one of the many paraffin preparations is useful and effective. Some German writers since the war have recommended powdered naphthalene and naphthalene ointments for this purpose.

A. Porter.

Howell (B. Whitchurch). **Typhus in Serbia.**—*Brit. Med. Jl.* 1915. Dec. 4. pp. 813–814.

This paper contains an account of an outbreak of typhus at Vrnjatchka Banja, Serbia. The patients were mostly Austrians, and the mortality was greater amongst them than amongst the Serbs.

On admission it was essential that the hair of the head and of the pubic region should be cut short and treated with paraffin or unguentum hydrargyri. Even then fresh broods of lice appeared.

It was considered that the more intense the rash, the graver was the prognosis. The cases were generally of the malignant type. As a rule, the fever fell by lysis with occasional "kicks" on the temperature charts, which, the author states, is contrary to the usual teaching. The initial symptoms were like those of influenza.

With regard to treatment, alcohol in half ounce doses was used, the quantity being increased steadily as the pulse got weaker. The heart was supported by the usual drugs and ether was sometimes given subcutaneously in very severe cases, alternately with strychnine.

A. P.

RUDIS-JICINSKY (J.). **Typhus in Serbia.**—*New York Med. Jl.* 1915. Dec. 11. Vol. 102. No. 24. Whole No. 1932. pp. 1175–1177.

The author worked at the base hospital at Skoplje, Serbia. A diplococcus was found to be present in the blood of many typhus patients. It was non-motile, Gram positive, did not coagulate milk or form indol or ferment grape sugar, nor did it split milk sugar. It proved pathogenic to rabbits, from which the diplobacillus was recovered. Subcutaneous injections of a bouillon culture of the diplobacillus produced an abscess containing a pure culture of the organism.

Measures were taken in the hospital for the destruction of head and body lice, both on the patients and on clothing. Paraffin or petrol destroyed the nits and, among other oils, were found useful on patients' heads and clothes. Exposure to heat was also useful for destroying lice on clothes.

The populace was instructed as to the early symptoms of the disease. With regard to treatment, the author remarks that "the supply of fresh air to typhus patients brought a great reduction in the mortality rate."

A. P.

GASTOU (Paul). **L'Epidémie de Typhus exanthématique à Belgrade. Notes Cliniques, Anatomiques, Etiologiques et Pathogéniques. Essais de traitement par les Sérums physiologiques citratés et iodés.**—*Rev. de Méd.* 1915. Aug. 1914.–Nov. 1915. Vol. 34. No. 8–9. pp. 559–578. With 8 figs. & 1 plate.

This interesting paper contains an account of the typhus epidemic in Serbia. 1,600 to 2,000 cases were seen in Belgrade. About equal numbers of men and women were infected. The outbreak is dated from the time of defeat of the Austrian army, when many prisoners from districts where typhus is endemic were taken. The conditions during the height of the epidemic were appalling; many details regarding them are given. Cerebrospinal symptoms predominated and there were other symptoms recalling cerebrospinal meningitis. Acute cases succumbed in three to six days. Ten per cent. of the cases died. Certain constant lesions were found at autopsy, cerebrospinal meningeal exudate and myocarditis being present. The dura mater was thickened and adherent. The brain was oedematous and pale. The left ventricle of the heart was usually hypertrophied. The lungs and other organs showed congestive lesions. The liver was white and soft and the suprarenals hypertrophied.

The louse is considered to be the transmitter of the disease. Examination of lice by darkground illumination showed fine rods with vibratile cilia; short, straight or curved rods; mobile spherules with flagella; brilliant motile spherules; spherules showing a polar body; a kind of diplococcus in the form of a figure of 8; a very thin immobile microbacillus, and colloidal granules. The thin immobile bacillus was the most common.

Examinations of the blood showed rapid haemolysis, absence of fibrin and coagulation, absence of haematoblasts, presence of elements

believed to be fibrin, large macrophage cells, eosinophiles, rare and often altered polynuclear leucocytes. Some cases with mononucleosis occurred. Abundant crystalline masses of haematoidin were present but no colloidal granules. *Plasmodium vivax* was sometimes present. Elements described as apparently parasitic were, spirilliform bodies; mobile spherules with a brilliant, peripheral polar grain; mobile spherules; small bacilli, which are immobile; small mobile bacteria; very small cocco-bacilli; a diplococcus in the form of a figure of 8.

The cerebrospinal fluid was usually clear. It contained undetermined mobile spherules, rods, diplococci in the form of a figure of 8, a Gram negative diplobacillus, and an almost invisible, immobile bacillus. The latter organism and the diplococcus were the most constant, but were only present in 6 out of 30 cases examined.

Cultures of the blood were made aerobically and anaerobically. No syringes were available and the cultures were sown direct from a vein. There was thus the possibility of contamination. The diplococcus in the form of the figure of 8 was obtained, and also a fine bacillus. Cultures of cerebrospinal fluid gave similar results.

Abundant ventilation and cold applications were employed. Applications of turpentine were of service in some severe cases. The injection of typhus blood into another case and also the injection of the patient's own blood into himself, as well as the injection of citrated blood from convalescents, have been used with good results in some cases. Injections of isotonic, citrated or iodised, sterilised solutions did not arrest the typhus but stopped the nervous developments. The iodised serum seemed better than citrated serum, and modified the malady by reducing it somewhat and producing a drop in temperature.

A. P.

Detre (Ladislaus). **Ueber Flecktyphus.**—*Wien. Klin. Woch.* 1915. Sept. 30. Vol. 28. No. 39. pp. 1049–1054. With 14 charts.

This paper contains an account of the authors' experiences with a typhus epidemic at Pozsony. He advocates the isolation of all patients, quarantine of all contacts, thorough measures against lice, and the use of clothing and headwear specially adapted for lice prevention. A discussion of the time of incubation period and of symptoms observed is given. The duration of the fever varied, 29 per cent. of the cases were between 4 and 7 days, 37 per cent. between 8 and 10 days. Two-thirds of all the cases recovered within 10 days. Some abortive cases were also observed and a number of patients with multiple infections of typhus with other maladies such as malaria, relapsing fever and chest complaints were encountered. The mortality in the winter was from 30 to 40 per cent., while in the spring a mild form with a mortality of only 11 per cent. prevailed. The author found that in six cases the injection of serum from convalescents gave defervescence in from 8 to 24 hours.

A series of temperature curves of typhus and of typhus complicated with other diseases such as relapsing fever and malaria is given.

A. P.

Juergens. **Zur Epidemiologie des Fleckfiebers.**—*Berlin. Klin. Woch.* 1915. June 21. Vol. 52. No. 25. pp. 654–661.

The paper contains an account of an epidemic of typhus observed by the author among Russian prisoners in a war camp in November 1914. The typhus outbreak was preceded by many cases of influenza, which complaint was apparently at first confused with the early symptoms of typhus. The onset of the typhus was extremely rapid. Body-lice were the agents in spreading the malady. It was found that men in charge of typhus patients and in close contact with them did not contract the infection, but those working with infected lice did so in a number of cases. The typhus appeared to have an incubation period of two to three weeks. Quarantining of patients and of convalescent men was practised. The principal prophylactic measures consisted in the destruction of lice and in simple disinfection methods. Five figures showing the arrangements at the camp are given.

A. P.

Otto. **Beobachtungen bei einer Fleckfieberepidemie.**—*Deut. Med. Woch.* 1915. Nov. 4. Vol. 41. No. 45. pp. 1325–1328. With 8 curves; Nov. 11. No. 46. pp. 1357–1359. With 3 text-figs.

A slight outbreak of typhus fever was observed by the author at the war-prisoners' camp at Weinberge bei Z. Relatively few cases of typhus occurred at this camp compared with the numbers at other camps. Lice were considered without doubt to be the transmitters of the virus. Very thorough measures for lice extermination were undertaken, and the camp was soon freed from them. After this occurred no further cases of typhus were reported. Treatment by cold baths, sometimes accompanied by administration of urotropin, was given.

A few atypical cases of typhus without the characteristic rash were identified by the temperature curve. Many polynuclear leucocytes and basophile granulation were observed in the blood. No protozoa-like bodies such as were described by Prowazek were seen, and the bacteriological examination of the blood was equally negative. Guinea-pigs were infected by intraperitoneal inoculation of blood, and some of them died. Complement fixation reactions were found to be negative in the early stages of the disease, and thus their value in diagnosis was rendered less.

Attention is drawn to the similarity of typhus clinically with Weil's disease, of which the author had previous experience. The analogy between the two diseases is considered as doubtless indicating an identical or nearly allied origin for both maladies.

A. P.

Fluegge (G.), Gaertner (A.), Bujwid (C.), Kisskalt, Uhlenhuth (P.) & Stoklosinski (Franz). **Umfrage über Uebertragung und Verhutung des Fleckfiebers,** [Symposium on the Method of Transmission and Prevention of Typhus.]—*Med. Klinik.* 1915. May 9. Vol. 11. No. 19. pp. 531–533; May 23. No. 21. pp. 586–587.

This paper consists of a series of reports made by the above-named workers on typhus cases, in answer to a series of questions suggested by Dr. Gustav Singer, of Vienna.

Flügge stated that practically only body lice were found on the patients, and that no infection took place through contact with infected blood. Transmission by the louse was possible after 5 to 7 days. For removal of lice, thorough soaping of the body is recommended. Clothing should be disinfected by wet or dry heat; leather sacks, uniforms, etc. by dry heat. No certain protection to workers with typhus cases was known. Rubbing with ethereal oils, the use of naphtha balls, thorough cleanliness, the use of closed-in clothing and of gum on garments to trap lice are recommended.

Gaertner considers that body lice are certainly the transmitters of typhus, and that head and pubic lice are suspect. Direct transmission by blood inoculation is possible, but is rare. For the destruction of lice, treatment of clothes, coverings and bedding with damp heat at 100° C. is recommended, while 2½ per cent. cresol or 3 per cent. carbolic acid solution should be used for the dwelling. All openings of clothing should be closed with linen strips treated with ethereal oil or naphthalene, and rubber gloves and high boots should be worn.

Bujwid thinks that an epidemic is started by spray from the breath of diseased persons reaching healthy ones by coughing. The person should be freed from lice by bathing. Floors should be wiped with a mixture of mineral oil or petroleum and turpentine. Fumigation of dwellings by sulphur dioxide against bugs, and the use of insect powder in transport wagons is advised.

Kisskalt emphasises the rôle of lice as infective agents. He also recommends the use of sulphur dioxide and naphthalene.

Uhlenhuth states that body lice certainly convey typhus, but lung and breath secretions may also play a part. The destruction of lice in clothing should be done by damp heat, while dry heat should be used for equipment and interiors. The greatest care must be taken to prevent the access of lice, and birdlime or fly-glue can be used as traps, if available.

Stoklosinski considers that blood-sucking Epizoa (various lice, fleas, bugs) are concerned in the transmission of typhus, which is spread more particularly by fleas. Flies and mosquitos may possibly aid in transmission. The extermination of lice is, in his opinion, not sufficient, but the destruction of all insects frequenting the person should be attempted. The flooring and walls of all sick rooms should be covered with washable material, such as linoleum. Thorough disinfection of clothing is necessary. Fly destruction should be carried out. The personnel of hospitals need well-closed cloaks, rubber gloves, and high boots reaching to the knee. Scrupulous cleanliness and good ventilation of the sick room are essential.

A. P.

Brill (Nathan E.). **The Form of Typhus Fever that is Endemic in New York City.**—*Med. Record.* 1915. Nov. 27. Vol. 88. No. 22. Whole No. 2351. pp. 914–917.

This interesting and well-written paper contains an account of the author's remarks made in opening a discussion on typhus fever at the New York Academy of Medicine, October 21st, 1915. It also contains a useful comparison of the mild, endemic form of typhus, known as "Brill's Disease," found in America, with the virulent, epidemic typhus. Dealing with the sanitary aspect of typhus, the author

stated that " the amount of typhus fever among nations was in *indirect* proportion to the amount of soap used. In other words, where cleanliness was not maintained, where the ordinary laws of hygiene were transgressed and neglected, there would be found typhus fever, with all its accompanying horrors." Consequently, it was associated with conditions of personal filth, with the segregation of people in confined quarters, with states producing squalor and famine, and followed in the wake of war.

Epidemic typhus fever is a disease most prevalent in cold weather, while the mild form is most prevalent in the summer months.

The main features of epidemic typhus are recapitulated thus :—

" It is a disease accompanied by profound toxemia, marked by the signs of an intense blood infection, by a marked involvement of the nervous system, manifested by delirium, by excitement, by tremor, by somnolence, stupor, coma-vigil, and an unusually severe involvement of the muscular system as well, as shown by the tremor and physical exhaustion which are so often manifest."

The second, mild, attenuated, endemic form of typhus (Brill's disease) and epidemic typhus are alike in their onset, in the first stage of the eruption, in the critical decline, and both are not followed by relapse. They differ in other respects. The eruption of the mild form rarely reaches the haemorrhagic or purple stage and spots which do not fade under pressure are rarely produced. Signs of profound involvement of the nervous system are absent. The patient is never seized with maniacal excitement during delirium, there is no coma-vigil, muscular tremors, subsultus or carphology, nor is there involuntary discharge of urine and faeces in the mild form. The headache in the endemic form becomes progressively more intense, even to the end of the illness, but is replaced by the more nervous manifestations after the first week in the epidemic form. The mortality in the mild form is less than $\frac{1}{4}$ per cent., while in the epidemic form it varies from eleven to sixty per cent. of the cases. While the epidemic form of typhus is one of the most communicable of all diseases, the endemic form shows no evidence of being at all communicable, and thus the body louse is not an important factor in the production of the mild form of the disease.

The author recalls the work of his pupil Plotz, who isolated the organism of the mild form and that of the epidemic form of typhus, and found them to be identical. The said diseases are thus identical, and the name " Brill's Disease " is superfluous, it being " a peculiar typhus fever which has been evolved by modern improved hygiene and sanitation." Both diseases are caused by the *Bacillus typhi-exanthematici.*

A. P.

Kantor (J. L.). **The Importation of Typhus Fever into the United States.**—*Jl. Infect. Dis.* 1915. Nov. Vol. 17. No. 3. pp. 522–527.

America is said to be exposed to importation of typhus from three sides, Europe and Africa, Asia, and Mexico, cases having already occurred from the last source. Typhus-bearing ships cross the Atlantic in about two weeks, and persons infected with typhus are usually recognisable as such when they arrive in America. The quarantine system reduces the danger of admitting cases of typhus from Europe to a minimum. However, lice imported on the persons of emigrants may harbour the typhus virus.

Details are given of three isolated cases in which typhus appeared after the arrival in America from Europe of the persons concerned. Typhus did not exist at the ports of departure, the space of time elapsing between the date of embarkation and the development of the disease in America exceeded the maximal incubation period, while the time between arrival in America and the development of the disease is within the incubation period limit. Infected lice harboured by immune fellow passengers probably brought about the infection of the victims.

In America, it has been found that all convalescents from Brill's disease (the endemic typhus of America) are typhus immunes, who may act as typhus carriers.

The author gives the following summary :—

"The isolation of immigrants sick with typhus fever and of their contacts, does not prevent the introduction of the disease into this country.

"It is very probable that immune carriers of typhus lice, by infecting individuals on shipboard, have caused the importation of cases of epidemic typhus fever.

"It is possible that Brill's disease may be the result of the introduction into this country (by immune carriers) of lice harbouring attenuated typhus bacilli.

"In order to prevent the further importation of all forms of typhus fever, attention should be directed not so much against individuals, as against lice, the actual carriers and transmitters of the disease in question.'

A. P.

Anderson (John F.). **The Epidemiology of Typhus Fever.**—*New York Med. Jl.* 1915. Dec. 11. Vol. 102. No. 24. Whole No. 1932. pp. 1172–1175.

The author deals with cases of typhus in Mexico. He has also seen 60 to 70 cases in England, as well as others in the United States. He finds no essential differences in typhus in these countries, except as to mortality and severity. In Mexico and in England the mortality is stated to be about 20 per cent., while in the United States it is only 2 per cent., and in the case of Brill's disease only 1 per cent.

Typhus is limited to temperate climates, and is only found in those regions of the tropics where such climates exist. The inability of the disease to spread in warmer climes, and its lessened prevalence in summer and autumn is believed by the author to be due to the effect of higher temperatures on the transmitting insect, *Pediculus vestimenti*. In Mexico typhus was never seen below an altitude of 5,000 to 6,000 feet.

The author has transmitted the disease to monkeys in Mexico by the inoculation of blood from human cases.

Among the preventive measures, lice extermination is recommended. It is also suggested that "inoculation with the mild type of the disease (Brill's disease), by persons contemplating entering places where the disease is prevalent" may be of service. "Should Plotz's work be confirmed, this may be replaced by the use of a vaccine prepared from the typhus fever germ."

A. P.

Allan (James W.). **Typhus Fever and Lice.** (Correspondence).—*Brit. Med. Jl.* 1915. Dec. 4. p. 841.

Davy (P. C. T.). **Typhus Fever and Lice.**—*Ibid.* Dec. 11. pp. 875–876.

The first paper deals with previous remarks regarding lice as the transmitters of typhus, and the author points out that it is unwise to regard lice as the sole source of danger. If a person unprotected by a previous attack remains for some time near a patient in a close, stuffy, unventilated room he runs the risk of contracting the disease, even if no lice are present. Previous writers (Davy and Brown, see below) have " found evidence that the infective agent resides in the body at least three weeks after defervescence. Fresh outbreaks occurred when patients returned to their companies after the three weeks' period, though they and their clothes were disinfected and were presumably lice-free." While not denying that infection may be carried by lice, and that every means should be employed to get rid of them, the author has faith in cubic space and free circulation of fresh air as prophylactics in the case of typhus.

The second paper is a comment on the preceding one. The author writes that, in a previous note, he wished to convey that " men who returned to their companies free of all lice immediately became infested with lice anew, and being still infectious, infected a new generation of lice, with the result that, in due course, a recrudescence of the epidemic occurred."

He also mentions that in the " high tension " type of typhus, it was common for the pulse rate never to go above 90 during the entire pyrexial period and to remain between 70 and 80, while the temperature remained on a plateau of 103° to 104° for several days.

A. P.

Wolter (Friedrich). i. **Ueber den Flecktyphus als Kriegsseuche.** [Typhus as a War Disease.]—*Berlin. Klin. Woch.* 1915. Aug. 9. Vol. 52. No. 32. pp. 851–854.

ii. **Ueber das Auftreten von Flecktyphusepidemien in Truppen- und Gefangenelager.** [The Occurrence of Typhus in Military and Prisoners' Camps.]—*Ibid.* Oct. 4. No. 40. pp. 1045–1048.

i. The author gives an account of the chief hypotheses that have been put forward to account for the spread of typhus fever. Curschmann's opinion that typhus was air-borne is discussed, and his views that fresh air and ventilation were most useful in treatment are quoted. The opinion of Lindner-Linz that the louse was the transmitter of the typhus virus is stated, together with Jürgens' view that it is not the infected man but the infected louse that spreads the disease. The work of other recent writers on typhus is noted. The paper is chiefly of interest from the historical side, but attention is directed to the danger of overlooking the possibility that typhus is air-borne in dealing with outbreaks.

ii. This paper contains a criticism of Jürgens' view that typhus is spread by lice, as was set forth in a recent paper by that worker. A detailed account of the place in which the epidemic observed by Jürgens occurred has led the present author to conclude that the louse transmission hypothesis is insufficient to account for the epidemic.

Removal of persons from an infected site is, in his opinion, sufficient to check and destroy the outbreak. The transmission of typhus by way of the air is considered the most likely means, and it is stated that miasmatic typhus is responsible for epidemics.

A. P.

Browne (James Crichton). **Note on Typhus Fever.** *Jl. State Med.* 1916. Jan. Vol. 24. No. 1. pp. 1–6.

A general account is given in a popular style of the main features of typhus epidemics. "Dirt, darkness, drink and destitution" favour the prevalence of typhus. The disease also appears where civilisation has broken down and hence is coincident with wars.

Lice are typhus carriers, more especially in war areas, but that does not preclude communication of the disease by other means. It is suggested that, like pneumonic plague, typhus may sometimes be spread by the breath, thus accounting for infections of doctors and nurses. The author states that "it seems that a certain concentration of the poison is necessary to cause infection," while the success of treatment in wooden huts with badly jointed walls is considered to "point to the danger of the accumulation of some poison in the atmosphere of confined spaces." While the louse is considered to be the principal transmitter, yet these other possible means of infection may be remembered. Some remarks on the differentiation of typhus from plague and relapsing fever are also given.

A. P.

Wagener (R.). **Zur Differentialdiagnose des Fleckfiebers.**—*Med. Klinik.* June 20. Vol. 11. No. 25. pp. 691–698.

This paper contains a long account of the symptoms of typhus and the course of the rash. It also sets forth in a very verbose manner the means of differentiating typhus from other complaints such as measles, influenza, miliary tubercle and meningitis. [A far more succinct and wider differential diagnosis can be found in Castellani and Chalmers' "Manual of Tropical Medicine," p. 1097.]

A. P.

Hetfield (W. B.). **Unusual Type of Typhus Fever on U.S.S. "Monocacy." Report of Case.**—*U.S. Naval Med. Bull.* 1915. Oct. Vol. 9. No. 4. pp. 641–643.

The record of a somewhat doubtful case occurring in a seaman at Chungking. The patient showed one characteristic feature of typhus, viz., the presence of a rash which at first disappeared easily under pressure, later with difficulty, and then not at all, and the occurrence of subcutaneous haemorrhage. The remarkable feature of the case was the complete absence of prostration and delirium in spite of a high fever. The only symptom the patient complained about was a sore throat and he suddenly died after a violent attack of dyspnoea. On post-mortem the epiglottis showed a decided catarrhal inflammation and was somewhat swollen though still patent. Oedema, however, seemed the most probable cause of death.

E. Hindle.

Remlinger (P.). **Le "Signe de la Langue" dans le Typhus exanthématique.**—*Paris Méd.* 1916. Jan. 8. Vol. 6. No. 2. pp. 42–43.

The author gives the results of his observations on an early sign observed by him in cases of typhus in Tangier during the last three years. It was found that if a patient suffering from typhoid or paratyphoid was asked to show his tongue, it was done without any difficulty. If, however, a typhus patient was asked the same thing, though he made every endeavour to do so, he could not succeed, or had but very indifferent success at the expense of very great effort. The tongue seemed to be stuck to the palate or at other times to be drawn back towards the larynx.

This sign has been noted previously by many workers, more especially by French workers, and that in many places, so that this peculiarity of the tongue is not restricted to Morocco. A number of quotations from various workers in different places are given in support of this statement.

A. P.

Coglievina (B.). **Neuere Behandlungsmethoden des Fleckfiebers.** [Recent Methods of Treatment of Typhus.]—*Med. Klinik.* 1915. Dec. 5. Vol. 11. No. 49. pp. 1351–1352.

Short notices of some of the more recent treatments devised for typhus fever are given in this paper—Werthheimer's treatment by exposure of the patient to direct sunlight [this *Bulletin*, Vol. 6, p. 393], the use of normal horse serum by Roubitschek [loc. cit., p. 392], the use of a typhoid vaccine by Mollow [loc. cit.]. Ichikawa has also used a vaccine intravenously. Ouftugeaninoff has treated typhus with iodine, but details of the dose have not been given.

The author's own work is given on the treatment of typhus with hexamethylene-tetramine, which in the body gives rise to formaldehyde, that has a sterilising action. One gram of urotropin was administered per oz., on the first day twice, on the second four times and, after that, five times daily. The good results obtained are stated to have accrued especially as the hexamethylene-tetramine reaches the cerebro-spinal canal and there exercises an antiparasitic action.

Quinine and salvarsan are said to have been shown to be useless by several previous workers. Other methods are not noted as they are considered to be still under test.

A. P.

Schuerer von Waldheim. **Zur Behandlung des Flecktyphus.**—*Med. Klinik.* 1915. June 6. Vol. 11. No. 23. pp. 643–645. With 3 charts.

The essential feature of the treatment for typhus, used in Mauthausen and detailed in this paper, is the use of cold wet applications and rubbing. The patient is wrapped in a cold, wet linen sheet, surrounded by two or three woollen wraps for one to one-and-a-half hours, and then has a cold rub down. The wet application and rubbing down is made every two hours during the day and every three hours during the night. If the temperature reaches 40° C. or more, the wet application is renewed hourly. At the commencement of the illness, hot milk, warm lemonade, orange, compote or prunes, was given in

teaspoonfuls. After the crisis had passed, mucilaginous soups, rice-milk, biscuit, etc., were given in larger quantities. Careful nursing was necessary.

It was found that alcoholic subjects stricken with typhus showed headache, great restlessness and delusions, while non-drinkers did not. If the patients had sound organs the prognosis was satisfactory, but if the chief organs had been weakened by self-indulgence, the prognosis was very unfavourable.

Temperature charts of cases of typhus, lasting 10, 11 and 8 days respectively, are given.

A. P.

Escluse. **Essai de Traitement curatif du typhus exanthématique par les "Injections intraveineuses de sang vivant de convalescent retardé dans sa coagulation par le citrate de soude."**—*Presse Méd.* 1915. Nov. 11. No. 55. pp. 450–451. With 3 charts.

The author was attached to the French military medical mission to Serbia. While at Belgrade, he treated three very severe cases of typhus with intravenous injections of blood obtained from a robust convalescent patient at the eighth to tenth day of defervescence. The usual aseptic precautions having been taken, 10 cc. of blood obtained from a vein in the arm of a convalescent was mixed with a little citrate of soda, and inoculated as rapidly as possible into a vein in the arm of the patient. Details are given of the three cases under observation.

The author's conclusions may be translated as follows :—

(1). Intravenous injection of living blood from a convalescent, to which a little citrate of soda is added, has been successful in very severe cases of typhus.

(2). There appears to be in typhus a very virulent toxin, which, having entered the bloodstream, has a predilection for muscular tissue, especially the myocardium, and for nerve cells. There is, however, in very severe cases of typhus a certain period, which it is proposed to determine methodically, when it should be possible to neutralise the toxic effects by blood immunisation. The natural phagocytic reaction of the body should be reinforced, perhaps prematurely, by injection during the fourth to the tenth day at the latest.

(3). It is essential that robust convalescents, in their eighth to tenth day of defervescence, only should be chosen.

(4). During twenty-four hours a total quantity of 30 cc. of convalescent blood can be injected in three doses with impunity. Cure may depend on perseverance with the treatment. (One patient received six injections spread over three days).

A. P.

Aschoff (L.). **Ueber anatomische Befunde bei Fleckfieber.** [Morbid Anatomy in Typhus.]—*Med. Klinik.* 1915. July 18. Vol. 11. No. 29. pp. 798–799.

An account is given of the various anatomal features observed in post-mortem examinations of typhus cases among prisoners. In addition to the usual features, the author notes that fatty conditions

of the serosa, dryness of the muscles and atrophy of the adipose tissue were common. The spleen was either enlarged or normal in size. The original swelling persisted in relapses. The spleen showed a peculiar tint of brown on puncture; it was not particularly brittle, nor was the liver. A waxy degeneration was sometimes seen in the abdominal muscles. Much more rarely there were deeply situated, diphtheritic, necrotic, exanthematous patches in the laryngeal mucous membranes.

Haemoglobin secretion was found in the kidneys, with haemosiderin pigmentation. Similar phenomena were seen in the spleen and to a lesser extent in the liver. Abundance of myelocytes in the capillaries of the medulla of the kidney is also noted. Short remarks on the usual appearances found in complications conclude the paper. The author rightly considers that a pathological, bacteriological, zoological and pharmacological investigation of typhus is needed.

A. P.

Fluegge (C.). **Schutzkleidung gegen Flecktyphusübertragung.** [Clothing Protective Measures against Typhus.]—*Med. Klinik.* 1915. Apr. 11, Vol. 11. No. 15. pp. 420–421.

This paper contains an account of measures suggested for combating typhus fever by preventing the attacks of lice that are the transmitting agents. Clothes, bed and bedding need attention. Ointments, ethereal oils, etc., rubbed in as preventives, are often useless. Two alternative measures are suggested. The first, Grassberger's method, described in detail, is to close completely all openings of garments and thus prevent access of lice to the body. The clothing is so made that as few openings as possible are presented. The lower garments are without openings, are fastened to a blouse or vest which in turn ends in a cowl, which leaves only the eyes free. This garment only allows of access of lice at the neck, waist and arms. All such openings are to be closed by the use of sticking plaster made of starch. The space between the rubber glove and the sleeve is lessened by the use of well closed cuffs, sealed up with strips of plaster. The opening from neck to breast is closed by press-in buttons, and further sealed with plaster. Great difficulty is experienced in closing in the neck, the use of plaster being impossible with bearded men. It is suggested that the collar of the protective clothing should be grooved, the grooves containing fly-glue or canada balsam. Lice could not pass through these sticky substances.

The second method advocated is the use of a very smooth cloth to which lice could not cling, and on which they could not crawl. It is believed that such a substance has been obtained. It is advised that openings in garments should be closed with plaster. Special care is needed in the case of attendants and nurses in prisons, camps, etc., who have to deal with vermin eradication.

A. P.

Delta (C. G.). **Sur la destruction des poux dans les épidémies de typhus exanthématique.**—*Presse Méd.* 1915. May 20. Vol. 23. No. 22. pp. 175–176.

The author gives an account of the measures adopted to determine means of destroying lice, made during outbreaks of typhus at

Alexandria. The harmful action of strong odours on lice had been suspected during the previous Balkan campaign, and was put to the test methodically in the outbreaks at Alexandria. Lice were exposed to various perfumes in tubes, and the effects noted. It was found that exposure to strong odours, such as that of an inferior but very strong and persistent smelling eau de cologne manufactured locally, was effective in destroying them.

During the outbreaks, the usual measures for disinfection of houses, clothing and persons were adopted, and in addition, washing of the entire body with the eau de cologne mentioned was used.

The main points of the author's conclusions may be summarised thus:—In order to combat the spread of typhus it is necessary, in addition to the disinfection of the infected neighbourhoods, to ensure the removal of lice from all persons in contact with the patients. Change of clothes and of linen is insufficient for this purpose, and it is necessary for baths of proper temperature to be taken. Nits are found attached to the person as well as to the linen, and washing with warm water is insufficient for their removal or destruction. Perhaps the use of strongly aromatic lotions, in which the perfume acts on the insect while the alcohol destroys the nits, may suffice. The destruction of the nits is considered highly important, as nits from infected lice may give rise to infected offspring. However, the epidemiological facts given are stated not to have proved definitely that perfumed lotions of alcoholic bases are efficacious, because the first results may have been due to causes as yet undetermined. However, it seems that the treatment here described merits further testing.

A. P.

Topley (W. W. C.). **A Report on a Bacteriological Investigation of Typhus Fever during the Serbian Epidemic of 1915.**—*Jl. R. Army Med. Corps.* 1915. Aug. Vol. 25. No. 2. pp. 215–228.

This paper contains the results of the bacteriological examination of some thirty cases of typhus fever at the hospital at Kragujevatz, Serbia. The majority were cases in the second week, with the rash well out and with a temperature between 102° F. and 104° F. A few cases provisionally diagnosed as typhus but presenting no rash at the time were also investigated. Ordinary blood films and thick films were made, also negative films with Chinese ink. Thick film preparations showed a varying number of microorganisms, the commonest being a long bacillus of the *Bacillus fusiformis* type. This, however, was found to be present in non-typhus cases. No appearances suggesting the presence of protozoal organisms were seen.

Cultures were made of eight clinically typical cases of typhus, the majority of the cases so examined proving fatal. The blood was obtained from the median basilic vein of the forearm. Cultures were made on broth, aerobically and anaerobically, similarly on agar and ascitic fluid broth and on kidney tissue-ascitic fluid agar (method of Noguchi).

Kidney tissue-ascitic fluid agar cultures.—In two cases, these remained sterile. In three cases, they remained apparently sterile for 14 days, but an opacity developed. At the end of this time a thin cylinder of the culture was removed and added to a tube of broth.

A similar cylinder from a control tube of ascitic fluid agar with kidney was also added to a broth tube. All the tubes were incubated. On the following day the three tubes with typhus cultures were cloudy uniformly, while the control tube remained clear. A flocculent deposit began to form on the second day, and increased in bulk while the supernatant fluid gradually cleared. Films of the deposits stained with Gram or methylene blue showed nothing. Ordinary wet films showed particles suggesting minute cocci or bacilli. It was found that these could be stained with a 2 per cent. solution of watery eosin applied for 20 minutes or more. Attempts to subculture this small organism failed. In three cases cultures prepared as described showed the presence of cocci, and subcultures of them gave cocci and minute pleomorphic organisms in 24 hours.

Broth and ascitic fluid cultures.—In every case a Gram-positive diplococcal organism was obtained. A flocculent deposit appeared above the blood layer and also clung to the sides of the tube. This form of growth seldom persisted in subcultures. Morphologically, the organism is a diplococcus, occurring in clumps or in short chains. Under some conditions it becomes ovoid and then stains easily and is Gram-positive. It grows much better under aerobic conditions. It has been grown on various media. On agar, the growth resembles that of a streptococcus or bacillus rather than that of a staphylococcus. It is somewhat translucent, and has a greyish-blue tinge by transmitted light. On McConkey's medium the growth is very slight. On Conradi and Drigalski's medium, the growth is very poor ; the colonies are at first whitish, then become pinkish.

In broth cultures, forms retaining the diplococcal form, but smaller than the original cocci and Gram-negative, appear. These increase rapidly in numbers, but become smaller and lose the typical coccal shape. In saline suspensions, kept at 37° C., the change into the minute Gram-negative organisms takes place rapidly. Large, granular masses such as are found in the broth cultures are rarely seen. In saline suspensions kept at 0° C., the change is almost completely inhibited. The small Gram-negative organisms appear more rapidly on all media under aerobic conditions.

Two examinations of cerebro-spinal fluid were made. One case showed no meningeal symptoms and the cultures remained sterile. In the second case, meningeal symptoms were present, and cultures of the cerebro-spinal fluid yielded the coccus as obtained from the blood.

No bacteriological examinations of the urine were performed.

In conclusion the author discusses the previous bacteriological results obtained in typhus investigations, and points out that many of the workers have obtained organisms that possess "striking similarities." These organisms have been isolated from outbreaks in different parts of the world by different observers. The exact relation of them to one another remains to be determined.

A. P.

Proescher (Fr.). **Zur Aetiologie des Fleckfiebers.**—*Berlin. Klin. Woch.* 1915. Aug. 2. Vol. 52. No. 31. pp. 805–807. With 2 text-figs.

The author has examined blood smears from nine typhus cases.

He makes dry smears, fixes in methyl alcohol for ten minutes and then stains for three to ten hours in a 1 per cent. solution of methylene-azur-carbonate to which 1 per cent. carbolic acid has been added. The smears showed more or less numerous, large, oval or unequal shed epithelial cells from the blood vessels. They contained very tiny diplococci and diplobacilli. These were 0·2μ to 0·3μ, and occurred either singly, in short chains or in groups. They were rarely found free in the plasma, and very rarely in polynuclear leucocytes. They were not found in control smears of normal blood, and of blood from such diseases as measles, mumps, scarlet fever, cholera and relapsing fever.

The author suggests that these minute bodies are the excitants of typhus, but as they have not yet been cultivated, the test cannot be applied. In favour of their specificity he states that (1) staining only with methylene-azur-carbonate renders them visible, (2) they do not occur in any other disease of known or unknown etiology, (3) their occurrence in shed epithelial cells of bloodvessels has not been observed in other diseases.

Proescher considers that the shed epithelial cells carry the virus of typhus, which is in agreement with Fraenkel's histological results, the latter worker having shown that the smallest cutaneous arteries underwent changes in typhus unlike those in other diseases, thus recalling periarteritis nodosa. The author considers that the virus is very probably inoculated into the endothelial cells by the bite of the louse.

The nature of the bodies described by Prowazek remains an open question. They are smaller than the diplococci and diplobacilli now found. Whether they are quite different structures or cocci undergoing phagocytosis, degeneration products or granules remains to be seen. More work is to be undertaken with a view to elucidating the matter.

Two microphotographic text-figures are given. A. P.

Arnheim (G.). **Ueber den mutmasslichen Erreger des Fleckfiebers.**—[The Supposed Cause of Typhus.]—*Deut. Med. Woch.* 1915. Sept. 2. Vol. 41. No. 36. pp. 1060–1062. With 2 text-figs.

The author briefly reviews the various theories as to the causative agent of typhus and adds notes on his own observations. His conclusions are as follows :—From the blood, sputum, and urine of typhus patients it is possible to cultivate a bacillus that presents various characteristic features. Whether all the strains of these bacilli are identical with one another is very doubtful, but they can be distinguished from other described bacteria. There is nothing to support the view that the causative agent is a protozoon. On the other hand these bacilli can be found in the various organs, blood, sputum, urine, also in the skin and it is more probable that they are connected with the aetiology of the disease.

With regard to the mode of transmission the writer disagrees with the view that lice are responsible, but is of the opinion that epidemics can be explained on the supposition that the malady is spread through the air by the patients' secretions.

E. H.

Petruschky (J.). **Bakteriologische Befunde bei Fleckfieber.** [Bacteriological Findings in Typhus.]—*Cent. f. Bakt.* 1. Abt. Orig. 1915. Mar. 13. Vol. 75. No. 7. pp. 497–498.

The author has examined the blood, urine and nasal secretions of a large number of cases of typhus. In the secretions very numerous small rod-like bacilli were constantly present, these forms resembling the influenza bacillus in the irregular form, size and staining reaction.

The secretions resemble those of influenza but contain a very tough slime of the consistency of liquid glue, throughout which occur various kinds of leucocytes often surrounded by blood platelets.

The bacilli do not grow on the ordinary influenza bacillus medium which contains red blood cells, but on ordinary agar, or preferably on nutrose-milksugar-agar. When the bacilli are grown on agar plates after incubation for 24 hours at 37° C. only very few colonies can be seen with the naked eye but on examination with a lens many smaller colonies can be detected. Subcultures can then be made, but it is simpler to let the cultures grow for 48 hours when these small colonies can be distinguished from the larger ones of Streptococcus and Pneumococcus. Controls made by culturing the secretions from influenza cases gave different results, the colonies of the influenza bacillus not growing in the absence of blood media.

The author is of the opinion that typhus is not transmitted solely by the agency of lice, but considers that the drops of secretion scattered by the patient coughing or expectorating constitute another source of infection. Finally attention is called to the methods of infection in plague and it is suggested that there are two types of typhus, one more septic transmitted by insects, and the other catarrhal, spread by the sputum of infected patients.

[As this article is only a brief preliminary note there is no experimental evidence in support of the various statements, but in spite of the author's opinions, the results of the present war furnish abundant proof that, in the absence of lice, typhus does not spread.]

E. H.

Gotschlich (E.), Schuermann (W.) & Bloch. **Ueber Serumreaktion bei Fleckfieber.** —*Med. Klinik.* 1915. Nov. Vol. 11. No. 48. pp. 1310–1313.

The principal points investigated by these workers were :—The specific complement fixation reaction between the serum of typhus patients and the specific antigen from typhus fever organs, the non-specific complement fixation between the serum of typhus cases and luetic antigen (Wassermann reaction), the non-specific reaction between typhus serum and extract of normal organs, work on the complement fixation between typhus fever anti-body containing material (convalescent serum) and blood from the early stage of typhus, research on the precipitin reaction between convalescent and diseased serum and on thermo-precipitin reactions between diseased serum and extract of typhus-infected organs.

The following conclusions were reached :—Practical serological investigations may determine whether specific precipitin or complement fixation reactions may be of service in the early diagnosis of typhus fever. The precipitin reaction gave constant negative results.

Specific complement fixation between typhus blood extract and convalescent serum was established from the sixth day of the disease. The reaction only occurs with active serum and non-specific fixation with luetic serum may be established. Typhus serum from the tenth to the twentieth day of the disease gives non-specific complement fixation with luetic liver extract, but not with normal organ extract. Stern's method acts successfully but the original Wassermann method is only successful in the minority of cases. Tables showing the results of each section of the work are given.

A. P.

Nicolle (C.) & Blaizot (L.). **Nouvelles recherches sur le typhus exanthématique. (Conservation et siège du virus. Typhus du lapin, etc.)**—*C. R. Acad. Sci.* 1915. Nov. 22. Vol 161. No. 21 pp. 646–649.

This interesting and concise paper should be consulted in the original by those working on typhus. The main points only can be summarised here. Two strains of typhus exanthematicus have been kept in animals for one and a half years at the Institut Pasteur, Tunis. One strain has already undergone 50 passages through monkeys, lice or guinea-pigs, especially the latter. The second strain, after passing through a monkey, has been kept in guinea-pigs and, at the time of writing, was in its 46th passage. The virus is conserved in guinea-pigs by intraperitoneal inoculation of cardiac blood. The virulence is not modified by passage through guinea-pigs, but seems to be increased in the monkey.

The virus is found in the blood (man, monkey, guinea-pig) and in the spleen (monkey, guinea-pig). In man the cerebro-spinal fluid and the washed red cells are non-virulent. In the guinea-pig, however, the entire blood, and in addition all the organs are virulent during fever. Even after prolonged washing of the vessels in saline solution, until the blood is removed, the spleen, suprarenals, bone-marrow, brain, kidney, salivary glands, pancreas, liver, muscle and intestinal wall are virulent. The authors emphasise this statement. Great virulence is exhibited by the blood during the first two days, and by the organs towards the third day.

On ice the virus lived up to six days, while at 37° C. it lived for two days.

For the first time, the authors have accomplished the transmission experimentally of typhus to rabbits. Details of four passages are given.

The length of the incubation period in animals varies. When the virus is transmitted from guinea-pig to guinea-pig the incubation period is usually rather short, namely 5 to 10 days. In the case of experimental rabbits it is longer, being as long as 34 days in one case. The authors emphasise the fact that it is necessary to take the temperature of the experimental animals for at least 45 days during the possible incubation period.

From an experiment it appears that the blood of a monkey may be infective during apyretic periods.

The authors give a summary which may be translated thus :—

(1). It is possible to conserve indefinitely the typhus virus by passage through guinea-pigs.

(2). During fever, the unknown germ of typhus is present in all the organs, even when the blood is removed therefrom.

(3). The virus remains infective on ice for at least six days, and for two days at 37° C.

(4). The rabbit is sensitive to typhus.

(5). It is necessary to take the temperature of experimental animals after inoculation with typhus for at least 45 days.

A. P.

Nicolle (Charles) & Blaizot (Ludovic). **Passage du virus exanthématique de la mère au nouveau-né.**—*C. R. Soc. Biol.* 1915. Dec. 31. Vol. 78. No. 20. p. 717.

The authors recall that abortion usually occurs in pregnant women suffering from typhus, and that this is the rule with subinoculated guinea-pigs. In one case which they have observed, a guinea-pig gave birth to a living young one, the parent having been inoculated ten days previously with typhus. The mother and the young one were killed after two days. It was found that the blood of the mother and the organs of the young one (spleen and suprarenal capsules) were virulent by peritoneal inoculation of them into other guinea-pigs. The maternal blood gave an inoculation period of twelve days, while the virus from the young had an incubation period of six days.

A. P.

Matthes (M.). **Ueber die Zahl und die Formen der weissen Blutkörper beim Fleckfieber.** [The Number and Forms of the White Blood Corpuscles in Typhus.]—*München. Med. Woch.* 1915. Oct. 5. Vol. 62. No. 40 pp. 1345–1347.

An account is given of some investigations of the blood of typhus patients. Usually a polynuclear leucocytosis was found but not invariably. Out of 55 cases, 34 showed over 10,000 leucocytes, but only three cases, two of them fatal, had over 20,000. At the height of the disease 80 to 85 per cent. of the leucocytes were polynuclear, while eosinophiles were almost lacking. At convalescence the increased numbers are maintained for some time, but the number of polynuclears diminishes to about 50 per cent., the number of lymphocytes increases and about two weeks after the fever eosinophiles are observed. Leucocytosis with a preponderance of polynuclears is considered to be diagnostic for typhus in doubtful cases.

A. P.

FEVERS IN THE TROPICS AND DENGUE.

Pelletier (J.). **Notes sur quelques cas de dengue.** —*Bull. Soc. Méd. Chirurg. Indochine.* 1915. Apr. Vol. 6. No. 4. pp. 143–147.

The author from his experience at the hospital in Haiphong draws attention to the variability of dengue as seen in this part of the far East. He describes four cases. Two of these had acute dysenteric symptoms, one was associated with glycosuria and muscular paralysis, and in the fourth there were multiple subcutaneous abscesses.

In the discussion which followed M. Gaudducheau emphasised the importance of differentiating what were true sequelae from possible concomitant affections, such as diphtheria and dengue, the former predisposing to the latter and evolving subsequently paretic symptoms.

He described some experiments of his own to infect animals with the virus of dengue. A Rhesus monkey aged about a year was inoculated under the skin by a lancet charged with blood taken from the author during the primary fever. By careful observations, it was noted that after two days' incubation the animal lost its appetite and appeared slightly ill and its temperature was increased by one degree for two days. On the third day after inoculation the blood of this monkey was inoculated into a second; this animal was also slightly ill. From the second a third monkey was inoculated but apparently without effect. This last animal was however much older than the two first inoculated. M. Gaudducheau showed how important it is to note carefully small details when carrying out animal experiments and that it is possible to infect monkeys with the invisible virus of dengue, producing in them a mild form of disease.

P. W. Bassett-Smith.

Gaudducheau (A.). **Bacilles trouvés dans le sang au cours d'une fièvre indéterminée.**—*Bull. Soc. Med. Chirurg. Indochine.* 1915. July. Vol. 6. No. 7. pp. 254–257. With 2 text-figs.

A case was admitted into the military hospital at Hanoi as typhoid fever, but the serum gave no reaction with Eberth's bacillus or paratyphoid B. After death the only intestinal lesion found was in the transverse colon, which showed a patch of congestion. Before death a blood culture was made and two types of bacilli were isolated: (*a*) A motile single flagellate bacillus obtained from an ox bile medium; this organism was an intermediate between the cholera vibrio and the typhoid group, but it did not liquify gelatine. The author states that it is the first time a single terminal flagellate organism has been isolated from the blood of man. It did not agglutinate with anti-typhoid or anti-cholera serum and was not pathogenic to rabbits, monkeys, or mice. (*b*) A non-motile bacillus cultivated in broth direct from the blood; on subculture on solid media it appeared as a cocco-bacillus, with involution forms. This did not agglutinate with anti-pest or anti-dysenteric sera, and was pathogenic to rabbits. The specific relationship of these organisms to the disease is uncertain, and further research is required to prove their pathogenicity for man, especially as no diagnosis of the particular form of fever was made.

P. W. B–S.

Le Roy des Barres. **Fièvre de Nature indéterminée à type récurrent, guérie par le Néosalvarsan.**—*Bull. Soc. Med. Chirurg. Indochine.* 1914. Dec. Vol. 5. No. 10. pp. 423–431. With 1 chart.

A very interesting case of a relapsing fever is fully described and a detailed chart is supplied. The patient was a native of Hanoi, aged 24, a female of good previous history. There were five acute attacks, the first lasting 15 days, the second 11, the third 4, the fourth 5, and the fifth 3 days; the intervals varied from 9 to 24 days. The temperature fell in each attack by lysis and during the pyrexia there was a definite eruption, often of a deep colour, present on the face and other parts of body. It always came out *after* the onset of the pyrexia, and lasted for about four days, was accompanied by a feeling of heat without irritation, and was followed by slight desquamation. Marked intestinal disturbances were present, vomiting, intestinal haemorrhage, distension of the belly and severe pains. The nervous system was profoundly affected during the attacks, acute delirium followed by drowsiness being observed.

Careful laboratory research did not discover any cause and therefore the author comes to the conclusion that he was probably dealing with a febrile disease not yet described. Complete cure was brought about by one intravenous injection of neosalvarsan.

P. W. B–S.

Olivier (P. H.). **Over een polyglandulair syndroom bij van der Scheer's koorts.** [On a Polyglandular Syndrome in van der Scheer's Fever.]—*Geneesk. Tijdschr. v. Ned. Ind.* 1915. Vol. 55. No. 4. pp. 385–392.

An account of 15 cases of what was apparently an aberrant form of dengue, in which swelling of the salivary glands was the prominent symptom. The author does not seem to have traced any infectivity between the cases.

The symptoms consisted of a febrile attack, often commencing with a rigor and followed by severe headache, pain in the eyes, and pains in the limbs and back. Sometimes there was also fusiform swelling of the fingers. A rash of a scarlatinal type appeared on the face and more exposed parts of the body, which only lasted for a day or two. This rash was succeeded on the last day of the disease by another of a morbilliform type on the trunk and limbs, which quickly disappeared. The temperature remained elevated for from two to six days and then suddenly dropped. The prognosis was uniformly good, though relapses occurred. The author principally insists on the presence of a tumefaction of the parotid and submaxillary salivary glands, with a concomitant tenderness in the epigastrium which he attributes to a concurrent pancreatitis. In some of the cases there was a slimy diarrhoea with fat crystals in the stools. Treatment was merely symptomatic.*

J. B. Nias.

* Van der Scheer's fever is described in Castellani & Chalmer's Manual: affection of the salivary glands is not mentioned.

Schueffner (W.). **Pseudotyphoid Fever in Deli, Sumatra (A Variety of Japanese Kedani Fever).**—*Philippine Jl. Sci.* Sect. B. Trop. Med. 1915. Sept. Vol. 10. No. 5. pp. 345–353. With 3 plates.

The experience of this disease during the past five years at Deli in Sumatra has confirmed the observations recorded by the author in a paper in the Transactions of the Bombay Medical Congress (1909). This communication contains no new information.

P. W. B–S.

Murray (W. A.). **Low Fever** (Correspondence).—*Jl. Trop. Med. & Hyg.* 1915. Sept. 1. Vol. 18. No. 17. p. 204.

Writing from Chittagong the author states that probably several diseases are entered under this name, yet there are undoubtedly quite a number which agree in detail with the description of the fever set forth in Rogers' book on "Fevers in the Tropics." In the author's experience the disease is almost entirely confined to European women. Blood cultures have been universally negative but he has found frequently a marked eosinophilia which is not due to intestinal parasites and he has obtained good results from the use of "orsudan" given hypodermically. These results, together with a cure of a case by a single intra-muscular injection of salvarsan, indicate that the disease is due to some protozoal infection not yet discovered.

P. W. B–S.

Spaar (Eric C.). **Notes on a Case of Fever due to *Bacterium Columbense* (Castellani 1905).**—*Jl. Trop. Med. & Hyg.* 1915. Dec. 15. Vol. 18. No. 24. pp. 281–282.

The patient was a Singhalese woman admitted into the General Hospital, Colombo, suffering from mild fever of one week's duration. There was some pulmonary congestion but the other organs appeared healthy. The temperature fell gradually and the fever ceased on the eighteenth day. The blood gave negative serum reactions for typhoid and paratyphoid A and B, but agglutination with *B. columbense* was marked up to 1/80 on two occasions. The organism was also isolated from the stools. The characters of the organism, as described by Castellani, are set out in full. The irregular reactions to lactose and litmus milk are peculiar, and these render differentiation of the organism difficult, as it may give identical cultural reactions with both para-typhosus B and *B. coli*, but by agglutination and absorption tests the distinction can be made sufficient to establish it as a specific entity and the causative factor of a short fever.

P. W. B–S.

Statham (J. C. B.). **Report on a Series of 800 Medical Pyrexias investigated on Behalf of the Yellow Fever (West Africa) Commission at Sierra Leone, from May to September, 1913, with the Inclusion of a Further 300 Cases investigated before the Formation of that Commission.**—*Yellow Fever Commission, West Africa. Investigators' Reports. Yellow Fever Bureau Bull.* Suppl. Vol. 2. 1915. Aug. 18. pp. 353–387.

When appointed by the Commission to report on the fever cases of Sierra Leone, the author at first hoped to be able to make a complete

survey of both civil and military cases, but he found it necessary to confine his observations to the military cases. These included a great variety of races and both sexes, some of whom were residents and others only temporary inhabitants. The 400 Europeans may be looked upon as non-immunes to yellow fever; the Syrians, mostly women and children, and 400 West Indians doubtfully immune; while the 1,200 West Africans would be immune. A total of 1,100 cases of fever were carefully registered. All possible laboratory examinations were made. Five volumes of records were collected and a synopsis of these is given in numerous tables, special attention being given to doubtful cases; a table of 70 of the latter is added to show the thorough methods employed. The children's cases are separated from those of the adults as they are specially difficult to diagnose. Roughly speaking two thirds of them are infected with malaria, but the fever from which they may suffer is not necessarily always malarial.

In the notes of the severest diseases which were found, the author favours the belief that West Africa provides a different "race" of sub-tertian parasite to the rest of Africa and India. He shows that the malarial incidence was at least five times as great among the European troops on Wilberforce ridge, which was surrounded by bush and near native dwellings, as amongst those of Tower Hill, which was anopheles free. No case of yellow fever was observed during the year; typhoid was rare but it probably exists among the West African natives;. the presence of dengue and phlebotomus fever is not yet proven; and trypanosomiasis and leishmaniasis at Sierra Leone are very rare. Malaria is still the predominant cause of fever and accounts for over three quarters of the cases of pyrexia. Incidentally, the author from his observations on human and guinea-pigs' blood does not place any reliance on Seidelin's bodies as of diagnostic value. He also points out that since the visit of Sir Rubert Boyce there has been a tendency to "find" yellow fever on the West coast in most cases with pyrexia and transient albuminuria, and he urges that more facts and less conclusions should be recorded.

P. W. B–S.

Gabbi (Umberto). **Intorno alle "Febbricole."** [Slight fevers.]—*Malaria e Malat. d. Paesi Caldi.* 1915. Sept.–Dec. Vol. 6. No. 5–6. pp. 239–244.

The author draws attention to the large number of cases of fever occurring in Sicily which are of uncertain origin, and quotes the dictum of Bacelli that to cure the disease it is first necessary to know the cause. Many of the cases are due to glandular tuberculosis, tertiary syphilis, chronic malaria, and intestinal toxaemia. He has for a long time demonstrated that some are due to melitensis infections, infective tonsilitis and articular rheumatism. Liver and kidney diseases account for some, also ankylostomiasis and neoplasms. In every case it is necessary to employ the reactions of Wright, Widal, and Wassermann, but there are a number of cases in which no recognised cause can be found and the organs are healthy, when the disease is due to a neurosis or hysterical phenomenon. He describes three cases of this form. The disease is generally associated with uterine irregularities with dysmenorrhoea, and is found in early married life. The common signs are, irregular mucous reflexes, cutaneous anaesthesia and

hyperaesthesia, mammary or vertebral hysterogenic zones, ovarian pains, and restricted fields of vision. In the first case described, cardiac disease was simulated, in the second pulmonary tuberculosis. The neurosis is better combated by suggestion than by medicines; drugs by the mouth are useless. When the thermometer is constantly used, it is advised that one should be supplied in which the scale indicates a reading much below the real one. In young neurotic married women without children, the disappearance of the fever, and even better, of the thought of the disease, is favoured when the husband, with the advice of the medical man, persists in carrying out this line of treatment.

P. W. B–S.

Blake (F. G.). **The Etiology of Rat-Bite Fever.**—*Jl. Experim. Med.* 1916. Jan. Vol. 23. No. 1. pp. 39–60. With 7 plates & 1 chart.

In this paper the etiology and pathology of rat-bite fever are chiefly discussed and the view held by Schottmüller [see this *Bulletin*. Vol. 4, p. 162] that the disease is due to an infection by a streptothrix, *Streptothrix muris ratti*, is strengthened by cultural and pathological evidence obtained in a case under treatment in the Peter Brent Bringham Hospital. The patient was a white woman, aged 67, who had been bitten by a rat on the finger. She was admitted to hospital two weeks later with fever, severe pains, and marked prostration. There was no inflammation about the scar or lymphangitis. The pyrexia was of an irregular character. She developed a finely mottled, reddish, slightly indurated skin eruption on one leg, and a systolic cardiac bruit was noted shortly before death, which occurred 15 days after admission. A blood examination on the first day gave abundant growth of a Streptothrix in both aerobic and anaerobic culture. A second blood culture four days later was negative, but at the autopsy the same organism was obtained from the heart blood as well as from an area of ulcerative endocarditis of the mitral valve. The organism gave positive agglutination reactions with the patient's serum before death in dilutions as high as 1/320. It was very slightly pathogenic for rabbits and white rats and not at all for guinea-pigs.

The Streptothrix isolated in this case differs from all others as yet described with the exception of that described by Schottmüller in his case of rat bite fever, and was peculiar in being Gram negative. The author concludes that rat-bite fever is a specific infectious disease following the bite of a rat, and is due to the *Streptothrix muris ratti*, which invades the blood stream, develops powerful agglutinins and causes pathological changes in the myocardium, kidneys, liver, and adrenals and, rarely, ulcerative endocarditis.

P. W. B–S.

Futaki (Kenzo), Takaki (Ftsuma), Taniguchi (Tenji) & Osumi (Shimpachi). **The Cause of Rat-Bite Fever.**—*Jl. Experim. Med.* 1916. Feb. Vol. 23. No. 2. pp. 249–250. With 1 plate.

The authors have recently had four cases of rat-bite fever under observation, two of which they were able to examine in detail. The symptoms of all were typical. In the first case systematically studied

they were able by dark ground illumination to demonstrate from the skin showing the peculiar rash definite, actively motile spirochaetes, rather larger than *S. pallida* and smaller than *S. duttoni*. The same kind of spirochaetes were shown to be present in the lymph of a swollen gland from the second case (shown in plate accompanying the paper). Blood and skin tissue of the patient were inoculated into monkeys, guinea-pigs, and white rats; these are stated all to have become infected and were able to transmit the disease.

The two cases were treated respectively with mercury and salvarsan; both recovered. Further investigations are in progress.

P. W. B–S.

Reid (Thomas) & Ritchie (John). **A Case of Rat-Bite Fever.**—*Edinburgh Med. Jl.* 1915. Sept. New Ser. Vol. 15. No. 3. pp. 186–190. With 1 chart.

A case of this rare disease is described very fully. The patient, a female aged eleven, was admitted into Lochmaben Combination Hospital suffering from diphtheria, from which she made a good recovery. Three nights before she had been admitted to the hospital she had been bitten by a rat in the ear. The onset was sudden, giving a definite incubative period of 17 days. The general characters of the disease agreed with those previously reported, but it was noted that "there was an apparent predilection of the toxin for the nerve centres, producing apathetic almost comatose conditions during the attacks, and an abrupt transition to normal in the intervals." The duration of the disease was 51 days and recovery was complete. No infective organism was found in the blood nor was there any eosinophilia.

P. W. B–S.

Oda (Z.). **Two Cases of Rat-Bite treated by Salvarsan.**—*Sei.-i-Kwai Med. Jl.* 1915. Oct. 10. Vol. 34. No. 10. p. 52.

The first case referred to was that of a girl bitten by a rat near the elbow. Symptoms came on after 24 days, pain, purple patches, and intermittent fever, etc. The second was a man bitten on the finger his symptoms appeared after 14 days. In both cases two injections of salvarsan were followed by complete recovery. The author describes the drug as being "definitely effective," but it is safer to give it in the intervals between the attack of the fever.

P. W. B–S.

PAPPATACI FEVER.

Sarrailhé (A.), Armand-Delille (P.) & Richet fils (Ch.). **Note sur l'épidémie de fièvre de trois jours (Dengue d'Orient) observée aux Dardanelles sur les troupes du Corps expéditionnaire d'Orient.**—*Bull. Acad. Méd.* 1915. Sept. Vol. 74. Ann. 79. (3 Ser.). No. 38. pp. 317–322.

The occurrence of tropical and semitropical diseases among the expeditionary forces in the Dardanelles area is to be expected, either endemically present or brought from without. The authors observed a definite epidemic of "three day fever" which differed in their experience from the dengue like fever common in the far East in that there was practically no eruptive stage and the duration of the fever was shorter. In the description of the cases the likeness to the ordinary phlebotomus fever as seen in Malta and the Adriatic is very close and this diagnosis is favoured by the presence of abundant *P. papatasii* in the area. Attention is drawn in the paper to two very important facts: firstly the prolonged period of asthenia following so short a fever, secondly the predisposition during convalescence to contract other infections as typhoid and paratyphoid B.

The cases began to appear in the middle of June but the number affected is not stated; relapses occurred in 50 per cent. of those attacked, generally four or five days after the temperature had fallen, but sometimes delayed as long as three weeks.

P. W. Bassett-Smith.

Higgins (J. T. D.). **Note on Cases of Phlebotomus Fever at an Island in the Eastern Mediterranean.**—*Brit. Med. Jl.* 1916. Jan. 29. pp. 166–167.

A small outbreak of phlebotomus fever is recorded in an island [name not given] in the Eastern Mediterranean, affecting eight persons in the garrison. Seven of the cases occurred between July 21st and August 1st, and six of these were from one house. The seventh case was an officer's servant, who came from another camp and only slept one night in the house; four days later he was attacked with the fever, a definite incubative period of three days. All the men slept on the ground floor, there was a quantity of old rubble round the house, *Phlebotomus papatasii* were abundant and all the patients had been frequently bitten by them. The sleeping place of the men was changed to a room on the upper floor and the broken masonry was cleared and covered with lime. This was effective in stopping the epidemic. The eighth case occurred in an old building which was also infected by the flies and was not used by any other men. The symptoms were of the usual type, producing a marked debility during convalescence.

P. W. B–S.

Randone (F.). **La Comparsa di un focolaio di " febbre dei tre giorni " in Siracusa.** [The Appearance of a Focus of Three Day Fever in Syracuse.]—*Malaria e Malat. d. Paesi Caldi.* 1915. Sept.–Dec. Vol. 6. No. 5–6. pp. 247–249.

The author describes a small epidemic of three day fever which occurred in a family group at Syracuse. The spread of the infection from one to the others was very definite, adults and children both being attacked. There was no doubt as to the diagnosis as the symptoms were typical and Phlebotomus flies were very abundant at the time. The family had only just settled into a house of recent construction, but surrounded by old ruined walls which are known to be favourable breeding places for phlebotomi.

P. W. B–S.

Martelli (Carlo). **La febbre dei tre giorni a Napoli.**—*Riforma Med.* 1915. Oct. 16. Vol. 30. No. 42. pp. 1156–1159.

The author mentions the wide distribution of three day fever and the special frequency in Naples of the disease amongst the soldiers. The general symptoms are enumerated and these are divided into two syndromes, *neuromuscular* and *gastro-intestinal.*

As there are no definite signs or symptoms to fix the diagnosis, this is sometimes difficult, especially when the course of the fever is more protracted than usual, when it may be taken for either rheumatic fever, influenza, malaria, or dengue. In the blood the changes found are generally very marked and are of real assistance in diagnosis. These characters are described fairly fully but are not new. In the Campagna a fever of short duration, coming on rapidly in the summer in a healthy person, which is attended with severe headache, pains in limbs and joints and does not react to salicylate of soda or quinine, is likely to be phlebotomus fever. Short summaries of five cases which were treated in the Military Hospital at Naples are given and a few remarks on the etiology and prevention of the disease terminate the paper.

P. W. B–S.

Stocker (C. J.). **Sandfly Fever and Bacteriology : Vaccine Treatment.**—*Brit. Med. Jl.* 1915. Oct. 2. pp. 503–504.

Under this somewhat comprehensive title the author reports from memory some observations on an epidemic of fever of a short duration, affecting 180 cases, which he made while in charge of the 79th Carnatic Infantry during their transfer from Bombay to Rangoon. Clinically the cases included three types: (1) sandfly fever, (2) dengue, (3) intermediate forms. Blood cultures were made from 36 of the latter and in five a bacillus identical to that found by Rogers was isolated. A goat was immunised with this and a sensitised vaccine was prepared, which used therapeutically appeared in some cases to act beneficially. The organism was not pathogenic to rabbits and a monkey. All the British officers were attacked at Rangoon. Mosquitoes (*Culex fatigans* and Stegomyia) were abundant, sandflies less so. From the stomachs of the mosquitoes a similar bacillus was obtained but it did not agglutinate with the immunised goat serum.

P. W. B–S.

Howlett (F. M.). **A Preliminary Note on the Identification of Sand-flies.**—*Bull. Entomol. Research.* 1915. Dec. Vol. 6. No. 3. pp. 293–296. With 2 plates and 1 fig.

It is probable that sandflies will give rise to discomfort among the troops in Southern Europe next summer as they did in the Gallipoli peninsula last year; therefore the author has put together a few notes in the hope that they may be of use to medical officers in differentiating these flies. Three species are dealt with—*P. papatasii*, *P. argentipes* and *P. minutus*. He states that for practical purposes the characters of the egg and newly hatched larva are most valuable, as these can be easily observed by keeping the fly and larva in a bottle and preventing dryness. In the plate the marking of the eggs are clearly shown and also outlines of the larva, which give differentiating characters. Other interesting details about the arrangement of the bristles on the larva and facts relating to the life history of the three species are given. *P. minutus* breeds more or less continuously through the cold weather at Pusa, Bengal. *P. argentipes* larvae hatching out at the beginning of the cold weather may develop either quickly or slowly. *P. papatasii* larvae hatching at the same time will remain as larvae until the next spring.

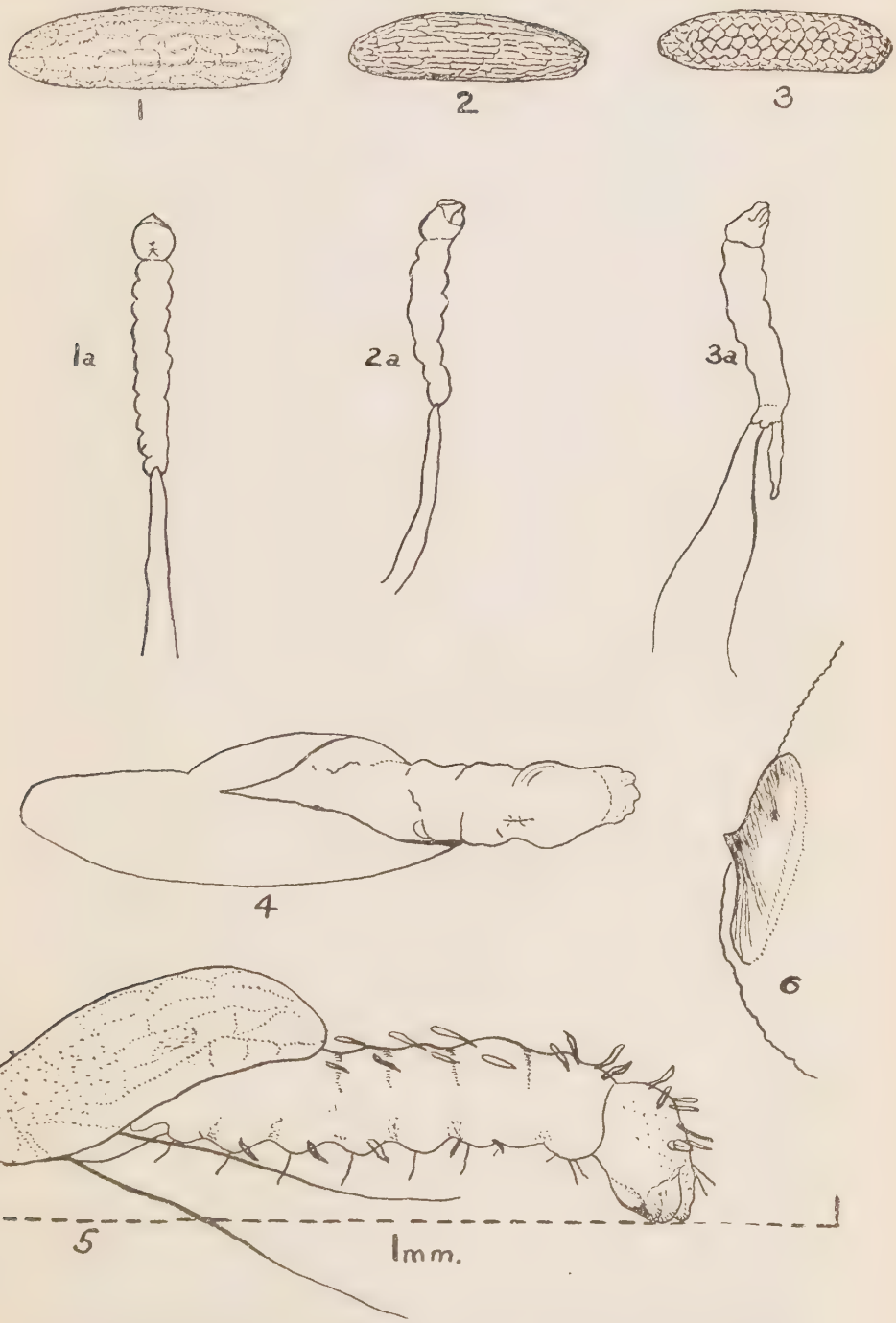
P. W. B-S.

Legendre (J.). **Sur l'existence dans la Somme du *Phlebotomus papatasii*, Scop.**—*C. R. Soc. Biol.* 1916. Jan. 8. Vol. 79. No. 1. pp. 25–26.

Phlebotomus papatasii has been recorded from various districts in France. The author on a visit to Vignacourt (Somme) in the early part of July found in a pit a packet of eggs attached to a fragment of floating manure. Some of these developed into insects like phlebotomi, which being sent to M. E. Roubaud were identified as *P. papatasii* Scop.

[This fact may be of importance in next summer's campaign.]

P. W. B-S.



Eggs and Newly Hatched Larvae of Indian Phlebotomus.

Fig. 1 & 1a. Egg and newly hatched larva of *P. papatasii*.
2 & 2a. " " " " *P. argentipes*
3 & 3a. " " " " *P. minutus*.
4 & 5. Larva of *P. papatasii* emerging from egg.
6. Egg-tooth of same.

UNDULANT FEVER.

Lafont (Amédée). **La fièvre ondulante dans ses rapports avec la grossesse, l'accouchement, et les suites de couches.**—*Arch. Mens. d'Obst. et de Gynéc.* 1915. Mar. Vol. 4. No. 3. pp. 97–137.

This very interesting paper deals with a phase of undulant fever which has received comparatively little attention though, as the author shows, important evidence has been collected year by year from many sources. All this information has been put clearly before the reader and at the end of the paper a complete summary of thirty-two cases is given, which is of extreme value. Some remarks are devoted to the methods of serum diagnosis and their difficulties and he quotes a case reported by Weil and Menard, where without any clinical evidence the blood agglutinated to 1/760 and even to 1/1,200. In discussing the influence of undulant fever on the genital organs the author notes that symptoms of this are quite common, ovarian pains, dysmenorrhoea, amenorrhoea, menorrhagia, etc. The *M. melitensis* has frequently been found to remain for long periods in the vaginal mucous membrane and contagion during intercourse is quite possible. Mammitis, like orchitis, is a not rare complication. The influence of the fever upon the pregnant woman may vary very much according to the period of gestation, and when the woman is infected. Speaking generally the influence is marked; abortion or premature labour are favoured, particularly during high fever. In some well authenticated cases it has been shown that the *M. melitensis* can pass through the placenta and infants born at term generally show signs of infection and are weakly.

The fever itself does not appear to be altered in character by pregnancy and pregnancy does not give any immunity from the disease. In cases of undulant fever in which labour comes on there is undoubtedly an increased danger from haemorrhage, both from the blood changes and from loss of muscular tone. Cantaloube and others believe that after labour the symptoms may become more intense due to lessened resistance. Lévi and others point to an amelioration more often of the symptoms. Sometimes symptoms like those of puerpural fever may come on and cause much trouble, but generally uterine involution is normal, and the lochia are healthy. Suppuration due to the *M. melitensis* has been described affecting the genital organs, as other parts of the body. The action of the organisms on the mammary gland is important; at first the secretion may appear normal but commonly after a few days it progressively diminishes and Williams in 1907 first reported the presence of the *M. melitensis* in the milk of a nursing woman. Whether or not the infant acquires the fever by drinking this infected milk is a debatable point; generally the child appears to have a congenital immunity, as early infection is rare. Zammit found this also to be the case with goats and their young. Still it would always be advisable to interdict the woman, whose mammary secretion was infected, from suckling her infant.

[In the paper Bassett-Smith is quaintly written as Basset-et Smith.]

P. W. Bassett-Smith.

Bassett-Smith (P. W.). **The Possible Recurrence of Mediterranean or Undulant Fever and its Treatment by Sensitized Vaccines.**—*Jl. R. Naval Med. Service.* 1915. Oct. Vol. 1. No. 4 pp. 431–439. With 4 charts.

The author considers it possible that, under war conditions, undulant fever may occur in epidemic form in the Mediterranean area and, after considering briefly the past history of the disease, he points out that Salonika, Constantinople, Beyrout, Smyrna, Alexandria, Cairo, Port Said, Suez, Cyprus, Candia and Malta are known endemic centres. He recalls the fact that inland places may suffer severely and mentions that infection may take place through the skin or mucous membranes, especially in rural districts. Although drinking fresh goats' milk containing the *M. melitensis* or its variety the *M. para-melitensis* is the usual method of infection, there are other ways of acquiring the disease and, just as in typhoid, insanitary camp conditions may lead to its dissemination. In this connection it is worth noting that horses, mules, cows and sheep may all become naturally infected, that milk products may harbour the germ, and that the latter is fairly resistant outside the body. The author lays stress on the occurrence of so-called intermittent types of the disease, where fever may be apparently absent or only slightly in evidence and which yet may be a cause of prolonged ill-health. He warns his readers that infection is present in the Mediterranean and is under control only so long as the necessary preventive measures are taken. These comprise complete medical control of all milk supplies with absolute sterilization thereof, avoidance of local milk products and disinfection of the stools and urine. Notes on vaccine treatment tend to show that the best results are likely to be obtained from the use of sensitized vaccines and two charts demonstrate the beneficial action of vaccines upon the temperature curve. A section of the paper is devoted to *M. para-melitensis.* Algerian goats brought from Spain were found to be frequently infected with this variety of the organism and it is important to recognize that this strain exists in man and to employ the appropriate laboratory tests for it.

A. Balfour.

Owen (S. A.) & Newham (H. B.). **Notes of a Case of Undulant Fever treated by an Autogenous Vaccine.**—*Lancet.* 1915. Sept. 4. pp. 536–538. With 1 chart.

There are few records of cases of undulant fever treated by autogenous vaccines. Hence the one here reported is of particular interest. The patient was a private, aged 23, who had apparently contracted the disease in Malta though he is stated not to have drunk goat's milk. The diagnosis was at first, as is so frequent, very uncertain, and the fact that he had recently been inoculated for typhoid increased the difficulty. In the early stages he was thought to be suffering from pneumonia. The persistence of the fever favoured a diagnosis of typhoid, but the character of the pyrexia with relatively good mental and general condition and a negative Widal made this unlikely. The patient was later admitted into the Albert Dock Hospital where the undulant type of the fever curve, agglutination reactions and isolation of the *M. melitensis* from his blood cleared up

the diagnosis. As no progress was made under general treatment autogenous vaccines were used, a dose of 200 million being given on four occasions at ten day intervals. These were followed by marked signs of improvement on each occasion, though after the last a typical attack of lobar pneumonia developed. Subsequently the man made a good recovery and was discharged to duty. It is noted that the authors in selecting the dose to be given were guided by the early work of Bassett-Smith, when 400 million organisms were injected every ten days without producing any bad symptoms; they therefore felt safe in using approximately half the strength employed by him, which gave the satisfactory result here recorded. Kennedy describes a case treated with autogenous vaccine; in this he found a dose of six to nine million given at short intervals most beneficial. [It is however probable that different strains may vary in toxicity.]

P. W. B-S.

Gabbi (Umberto). **Varietà cliniche rare e complicanze nuove nella febbre mediterranea.** [Rare Clinical Varieties and New Complications in Undulant Fever.]—*Malaria e Malat. d. Paesi Caldi.* 1915. July–Aug. Vol. 6. No. 4. pp. 183–188; and *Riv. Crit. Clin. Med.* 1915. Oct. 2. Vol. 16. No. 40. pp. 569–573.

The author refers to the wide diffusion and great increase of reports of undulant fever in Italy between 1906 and 1914, which depends largely upon a better knowledge of the symptoms and complications of this fever. Cases of splenomegaly have already been described; he now gives in full three cases with unusual nervous symptoms. The first case was that of a girl aged 18, in whom the disease was associated with hyperpyrexia and an evanescent lesion of the right upper lobe of the lung; excepting enlargement of the spleen there was no organic lesion; the diagnosis was confirmed by Wright's test. In the second case the fever was accompanied by symptoms of non-organic angina pectoris dependant upon the toxic action of the micrococcus. The third showed multiple chronic muscular spasms (paramyoclonia multiplex), due probably to the toxic action of the organism on the cells in the Rolandic area. This case was fatal. The author refers to the very important experimental investigations of the action of the toxin on the nervous system made by de Nunno and reviewed in this *Bulletin* [Vol. 6, pp. 164–165].

P. W. B-S.

Cozzolino (Olimpio). **La febbre melitense o Mediterranea o ondulante nei bambino. Rivista Sintetica (con contributi clinico-epidemiologici.)** [Undulant Fever in Children.]—*Pediatria.* 1915. Aug. Vol. 23. No. 8. pp. 561–567.

This paper contains no new facts. Attention is drawn to the occurrence of cases of undulant fever in children, 41 of which have been recorded. The author adds seven more. The duration varies from 3 months to one year, the mortality being 6 per cent. as against 23 per cent. in adults. An arrested development with mental deficiency is not uncommon. Longo and others have noticed meningeal

symptoms in young children. For treatment the good results obtained by use of Trambusto-Donzello's serum are noted, but these should be accepted with some reservation owing to the uncertain course of the disease. Experimentally, intravenous injections of 1 or 2 cc. of a one per cent. corrosive sublimate solution have been useful, and also intra-muscular injections of a ten per cent. solution of electrargol.

P. W. B-S.

de Angelis (G.). **Valore diagnostico dell emoculturo nella febbre di Malta.**—*Gazz. d. Osp. e. d. Clin.* 1915. July 4th. Vol. 36. No. 33. pp. 817–821.

An anomalous case of fever in a resident of Bologna, aged 60, is described, which was variously believed to be an obstinate form of intestinal sepsis or irregular malaria; but no malarial parasites were ever found and ordinary blood cultures on agar gave negative results. The fever commenced in December 1913 and in Nov. 1914 the author suggested a fresh trial by blood culture, using a modification of Tizzoni's method, to clear up the diagnosis. The method consisted in allowing 10 cc. of the blood removed from a vein in the arm to clot, removing all the serum with its bactericidal contents and culturing the clot into fresh broth daily. The serum was found to be sterile but the organism was obtained on the sixth day from the broth of the washed clot. It was of a minute bacillary form, $0{\cdot}3 \times 0{\cdot}8\mu$, but very pleomorphic, motile but not passing through a sand filter recommended by Carnot and Garnier for isolation of *B. typhosus*. Culturally it gave the typical reaction of *M. melitensis* and positive serum reactions. It grew well in defibrinated rabbits' blood and in guinea pig bile broth (1–9), but not in the undiluted sterile bile of the animal. Inoculation experiments into rabbits and guinea pigs showed that it was pyogenic, that its virulence could be greatly increased by passage, and that a culture from one passage in a guinea pig injected sub-durally into a rabbit caused death in 36 hours. The patient's blood reacted up to 1/200 with a type culture of *M. melitensis* and the blood of animals inoculated with the organism isolated from the patient reached an agglutination titre of 1/1,000.

[The isolation of the *M. melitensis* from the blood of a case of undulant fever one year after the onset with an intermittent type of pyrexia is of great interest and importance.]

P. W. B-S.

Vernoni (Guido). **Il primo caso autoctono di febbre melitense nella provincia di Bologna.**—*Malaria e Malat. d. Paesi Caldi.* 1915. July–Aug. Vol. 6. No. 4. pp. 175–183. With 1 text-fig.

The case described is that of a woman aged 23, a native of Forli. While at Bentevoglia in the autumn of 1914 she suffered from a quotidian fever with sweats, articular and muscular pains, and swelling of the glands under the jaw. The fever with periods of apyrexia continued till April 1915. She was admitted to the hospital at Bologna in February. The spleen was enlarged and hard. Widal's test and examination of cerebro-spinal fluid gave negative results. On 2nd March 10 cc. of blood were drawn off and examined by

Prof. Tizzoni, who made cultures in broth, hydrocele fluid and on Löffler's blood serum. A minute bacillary organism like that of influenza was obtained and abundant cocci-bacilli and diplococci; these showed active movement but no true motility. The cultured characters are given very fully. The living organism had a specific pyogenic action for rabbits and guinea-pigs whether injected subcutaneously or intra-peritoneally, but when heated to 56°-60° C. it lost its pathogenic and pyogenic action. Serological tests gave positive agglutination reactions at 1/10—1/160. The serum of rabbits after four inoculations agglutinated the *M. melitensis* up to dilution of 1/1,200. Statistics show that the neighbourhood of Forli has given cases of undulant fever for six years, but it is rather rare or probably the cases are not always recognised. The woman was the only one of the family infected and etiologically it was not possible to exclude in this case infection by milk, though there was not any direct proof.

P. W. B-S.

Tonnini (Luigi). **Due casi di febbre mediterranea nel basso Polesine** [Italy].—*Policlinico*. Sez. prat. 1915. Aug. 8. Vol. 22. No. 32. pp. 1069–1070.

A short description is given of two cases presenting the symptoms of undulant fever. Both were in women but the diagnosis could be proved by the serum reaction in one only. The method of infection was not discovered but there seemed to be no evidence that goats had conveyed the disease, though these were present in the district. An examination of the goats has been undertaken by the local sanitary authority to find out whether they are infected.

P. W. B-S.

Spagnolio (G.). **Note di Patologia esotica. Casi di mastite melitense e sprue.** [Mastitis due to Undulant Fever.]—*Malaria e Malat. d. Paesi Caldi.* 1915. Sept.–Dec. Vol. 6. No. 5–6. pp. 244–247.

Among the subtropical cases occurring in Sicily and studied at the University of Palermo, undulant and "three day" fevers are common but forms of climatic bubo and sprue are occasionally found. The author describes two cases. (1) A female, aged 16; on the fifteenth day of the fever an inflammatory and painful condition of the left breast was noticed, which lasted about two weeks; menstruation was increased and epistaxis occurred. This mammitis is analogous to the orchitis found in man and is probably due to the *M. melitensis* or its toxin. The original diagnosis was confirmed by a serum test on the seventh day, agglutination at 1/200 being obtained. (2) The second case, given in detail, was seen by Prof. Gabbi and diagnosed as sprue; the course was long but recovery was complete. No amoebae or dysenteric bacilli were present but a species of *Monilia* was isolated. The patient was a native of Palermo and had previously had good health.

P. W. B-S.

Martins Pereira (João José). **Um caso de febre de Malta.**—*Med. Contemporanea.* 1915. Oct. 17. Vol. 33. No. 42. pp. 337-339. With 1 chart.

The author describes a case of undulant fever admitted into the Hospital of St. Martha. The patient was a man aged 30, a native of Obidos. The fever ran a long course and was of undulatory type; there was marked headache and pains in the limbs, persistent especially during the febrile attacks. Progressive anaemia was induced and relative blood counts showed a high percentage of lymphocytes. The diagnosis was confirmed by Bettencourt by agglutination reaction with the *M. melitensis*. The differential diagnosis from malaria, typhoid, and paratyphoid fevers is detailed rather fully.

P. W. B-S.

Strachan (P. D.). **Undulant or Malta Fever in South Africa.**—*South African Med. Rec.* 1915. June 26. Vol. 13. No. 12. pp. 171–178; July 10. No. 13. pp. 186–191; July 24. No. 14. pp. 204–211.

The author gives a very full and interesting description of undulant fever in South Africa from his unrivalled personal experience. He was fortunate in having the constant cooperation of Lt. Col. Birt, Major Buist, McNaught and others, who assisted in the laboratory examinations for diagnostic purposes. He draws attention to the fact that the disease was notified in Cape Colony under the term undulant fever as long ago as 1907, but the first probable cases were described by Dr. Simon Fraser in 1898. At Kimberley in 1903 it was known as camp fever; the name however included both typhoid and paratyphoid infections. On his first starting practice at Philippolis in the Orange Free State there was considerable difficulty in getting a laboratory confirmation of a clinical diagnosis owing to the absence of a reliable culture of *M. melitensis*. The author refers to Dr. Garrow's experience of an epidemic of the fever in Steytlerville, Cape Colony, in which cases with little or no fever were frequent, but it is impossible to prove that these ambulant cases have *never suffered from fever*. In African practice the author points out how a case may be seen in the morning, with a normal or subnormal temperature, and then not again for weeks, which demonstrates the importance of care in diagnosis and the use of serum reactions. His analysis of the chief symptoms from 268 cases is found to agree fairly closely with that of Eyre, but headache as a symptom is much less common in South Africa than in Europe. Dr. Strachan insists on the importance of the appearance of the tongue as a diagnostic feature, typically clean, red at tip and edges, and elsewhere covered with a light silvery fur. He discusses very fully the cold abscesses which appear late in the disease (in 1·8 per cent. of his cases), which simulate closely tubercular disease, and are probably often secondary tubercular foci in constitutions broken down by prolonged attacks of this debilitating fever. Symptoms of meningitis or cerebritis were rare; notes of three cases are given, one in a child aged nine.

Frequent reference is made to earlier papers by Birt and the author and much detailed information is given with regard to methods of serum diagnosis, 1/10 being taken as a safe dilution. It is noted that the serum loses very markedly its agglutinins by keeping.

A serum six weeks old agglutinated at 1/12,000, eight weeks after at 1/8,000, two years later 1/600 (BIRT). Contamination with other bacteria did not prevent the reaction! The average agglutination value of serum in negroes is less than half that of whites, while the percentage of blood cultures was a little higher than in whites. Cultures were obtained from two samples of blood which gave *no* agglutination, while two with titres of 1/4,000 and 1/5,000 both gave cultures; in the latter there was only one colony which appeared on the 41st day. The *M. melitensis* can therefore live for weeks in serum containing powerful specific agglutinins. All agglutination tests are stated to have been efficiently controlled; living cultures were considered by BIRT to be less reliable than dead ones, the microscopic method apparently being preferred, though sedimentation was also used if time permitted. Many of the samples were tested by BIRT in England as well as by others in South Africa. Cultures were often made from blood clot planted on glucose nasgar litmus agar. The agglutinins persist for a long time after recovery, (according to BIRT and LAMB for seven years). A rising agglutination curve points definitely to present infection; on the other hand in the absence of clinical signs a weak positive reaction may indicate nothing more than a past infection; this requires careful consideration before vaccine treatment is instituted. *The culture of M. melitensis used should not agglutinate normal serum or that of other diseases in a ten fold dilution.* A negative reaction with presence of fever is strong evidence against the disease being undulant fever.

The association of the disease in South Africa with presence of infected herds of goats is definitely proved, and many examples are given, but for detection of animal infection the milk test was given up by the author, being very unreliable in comparison with the serum test. Much difficulty was at first experienced in convincing the population as to the danger of goats' milk, but this is now generally recognised. At Steytlerville, which is 2,000 feet above the sea level, there was a severe epidemic both among the people and goats, the latter in the district being estimated at 260,000, the greater proportion of the *Angora* breed. Out of all the goats tested by the author in South Africa less than 10 per cent. gave positive reactions with a 1/10 serum dilution. There was no doubt that some of the cows at Steytlerville were infected. He states that *it is not unlikely that South African farmers and their families* sometimes become infected by the dust in and about the goat kraals, which are built quite close to the dwelling houses. The cows are often confined in the same building at night with the goats and from the soil infected by the urine of diseased goats they become infected. He notes that goats in South Africa are not now bred for their milk but for their flesh and wool, so that the peculiarities attending the Maltese goat in Europe do not hold good for South Africa. The seasonal incidence of the disease in South Africa is greatest in the hot months of December, January, and February; during the dry summer months cows' milk is scarce and goats' milk is more likely to be used. In the early winter the goats are pregnant and dry and the month of August is the only one in which no fresh cases were found by the author.

A few prophylactic rules are given. Since 1908 in his district there has been a steady decrease of cases due to more general knowledge

among the people of the cause. There is a small error in page 209, "improbable" being used instead of "probable" in reference to the milk being the source of infection to the troops in Malta.

P. W. B-S.

de Korte (W. E.). **Some Notes on Malta Fever.**—*South African Med. Rec.* 1915. Aug. 14. Vol. 13. No. 15. pp. 220–223.

In the chronic cases of undulant fever as seen by the author in South Africa there is generally a marked but slight fibro-cellular oedema. He suggests that the nerve symptoms which frequently accompany the disease may result from epi- or peri-neuritis due to oedema of the fibrous sheaths of the nerves. He states that examination of the blood shows an increase in the mononuclear cells and a decrease in the polynuclear in the early stages, but that in the chronic conditions there is an increase in the latter and decrease in the former cells [this is directly contrary to what has usually been observed elsewhere]. He also states that in Africa the urine in most cases has a very unpleasant odour and that apparently there is a diminished quantity passed. During convalescence under vaccine treatment the quantity is markedly increased and the smell is less offensive. He advocates very strongly vaccine treatment but this must be continued, and he states that forty or fifty hypodermic injections are not a high price to pay for a cure; many cases however do not require so great a number. A cessation of treatment before immunity has been reached is followed by a relapse; an injection given every three or four weeks will generally prevent recurrences. Small doses up to 20–30 millions, should be given at first every third or fourth day; after four or five the dose is increased to 40–50 million and the interval extended; when improvement is marked 75–100 million may be given once a week. After about six weeks one may expect permanent improvement, though relapses do occur. Generally speaking, with vaccines the lowest effective dose is better than the higher ones.

[It is a pity that the term "Malta Fever" should be so continually used for the disease in South Africa where it is often known locally as Camp Fever. In the discussion that followed, the *M. paramelitensis* is erroneously stated to have been called the *Micrococcus brucei* instead of *M. melitensis Br.* Nicolle, and Dr. Pratt stated that sensitized autogenous vaccines often succeeded when the ordinary ones failed.]

P. W. B–S.

Velez Lopez (L.). **La Melitococia en la Provincia de Trujillo.** [Malta Fever in the Province of Trujillo (Peru).]—*Cronica Med.* Lima. 1914. Feb. 28. Vol. 31. No. 604. pp. 58–62 With 1 chart.

A note of a typical case of Malta fever, observed by the author, in a woman who lived on a goat farm and had been in the habit of drinking goats' milk. *Micrococcus melitensis*, in a state of pure culture, was obtained from blood taken from the saphenous vein. The experience has enabled the author since to diagnose other cases in his practice. Malta fever was first recorded in Peru by Barton of Lima.

J. B. Nias.

PLAGUE.

Creel (R. H.). **Epidemiology of Plague in New Orleans.**—*Amer. Jl. Trop. Dis. & Prevent. Med.* 1915. Sept. Vol. 3. No. 3. pp. 122–143.

An account is here given of the outbreak of human plague which commenced in New Orleans in June 1914 and lasted until the month of October in the same year. In all, 30 cases occurred with a low mortality of 33 per cent. The origin of the epidemic is unknown. Rodent plague was demonstrated after a week of intensive trapping on the 12th July and the last rodent case (at the time of writing) occurred on April 24th, 1915.

With regard to the epizootic, some points of interest arise in connection with the latency of infection among the rodent population. At one focus, the first infected rat was trapped on the 28th July, the second on the 4th August, and then followed an interval of 51 days before the trapping of the third infected rat took place on the 24th September. At another focus intervals of between one and two months occurred between the capture of infected rats. In yet another case, five months elapsed between the capture of infected rodents, no infected rat being discovered within a half mile radius during the interval. The probability of the retention of *B. pestis* in the body of the flea for such extended periods of time, without occasioning rodent plague, is disregarded [but see Bacot, this *Bulletin* Vol. 5, p. 393], and the suggestion is made that the infection may have been carried over by rats suffering from "resolving plague," the organisms possibly being harboured in the cutaneous tissues.

If there is a sufficient number of rats in a building to accommodate the flea population, human inmates are afforded relative immunity from plague, regardless of rodent infection. As the rat population decreases, the number of fleas per rat increases, and when the rodent hosts are not sufficient in number or are not readily available to the cast-off fleas, human beings become liable to attack. From the practical point of view, therefore, all means of rat destruction should be accompanied by flea destruction (spraying with pulicidal solutions and rat proofing; the rat burrows being sealed by concrete flooring).

R. St. John Brooks.

Lafont (A.). **Une épidémie de peste humaine à Dakar (avril 1914 - février 1915).**—*Bull. Soc. Path. Exot.* 1915. Nov. Vol. 8. No. 9. pp. 660–680.

An account is here given of a virulent epidemic of plague which occurred among the natives of Dakar during the years 1914–1915. Whole families were blotted out by the disease; in the village of Yoff, 15-17 kilometres from Dakar, for example, four-fifths of a population of 1,200 souls succumbed to the disease. A large number of the cases appear to have been pneumonic in origin.

R. St. J. B.

van Loon (F. H.). **Een geval van reïnfectie bij pest.** [A Case of Plague Reinfection.]—*Geneesk. Tijdschr. v. Ned. Ind.* 1915. Vol. 55. No. 4. pp. 474–477. With 1 chart.

The patient, an Indo-European aged 18, was picked up by the Toeren ambulance on the 6th December, 1914 and brought to hospital. He had been taken suddenly ill on the 4th December with symptoms of bubonic plague. The bubo was situated in the right inguinal region, a pure culture of *B. pestis* being obtained therefrom. The patient made a rapid recovery and was discharged cured, on the 29th December 1914. The interest of the case lies in the fact on the 23rd July 1914 the patient had reported sick and was found to be acutely ill with symptoms of pneumonic plague, examination of the sputum for plague bacilli being positive. On this occasion, also, he made a good recovery, a second examination of the sputum, one week later, being negative. The question, was the second infection the result of reinfection or recrudescence? remains unanswered.

R. St. J. B.

Seemann (William H.). **Experiences in the Treatment of Plague in New Orleans, La.**—*Amer. Jl. Trop. Dis. & Prevent. Med.* 1915. Nov. Vol. 3. No. 5. pp. 281–288. With 3 charts.

Twenty-four cases of plague were given serum treatment at the Emergency Hospital of the Board of Health of the City of New Orleans. The treatment was based on the Yersin serum as produced by the Pasteur Institute of Paris. Eighteen cases received serum and of these only three died. In two of these fatal cases a hopeless prognosis was held out from the first. [As there was no adequate series of control cases which did not receive serum treatment, it is difficult to appraise the value of the results obtained in the series of recoveries.]

R. St. J. B.

Crowell (B. C.). **Pathologic Anatomy of Bubonic Plague.**—*Philippine Jl. Sci.* Sect. B. Trop. Med. 1915. July. Vol. 10. No. 4. pp. 249–307. With 5 plates.

This paper embodies the author's observations on 75 cases of bubonic plague autopsied in Manila between June 1912 and June 1914, and from this somewhat extensive series important and interesting conclusions have been reached. From the pathological standpoint Crowell has come to the conclusion that only two main types of plague should be recognised: namely, the primary bubonic and primary pneumonic types. The former may be subdivided as follows, in order to give prominence to the features most commonly encountered: (1) Uncomplicated bubonic plague; (2) Bubonic plague (with early septicaemia or without superficial buboes); (3) Bubonic plague (secondary pneumonic type); (4) Bubonic plague (secondary meningeal type); and (5) Bubonic plague (secondary cutaneous type). "To follow this classification to its logical conclusion, those types in which focal hepatic or renal lesions are present should also be separated, but this would serve only unduly to complicate the classification, especially as these types do not present prominent clinical differentiating characteristics."

"Septicaemic plague" is not regarded as a well defined pathological entity, as any case of plague in which the organisms multiply in the circulating blood is a case of septicaemic plague, and thus all cases of fatal primary bubonic plague would be placed in this category.

A careful and accurate description of the gross pathology and histopathology of plague met with in the various affected organs is given under different headings, which are divided into skin, lymphatic glands, pharynx and tonsils, respiratory system, spleen, liver, gastro-intestinal tract, peritoneum, cardiovascular system, nervous system, urinary system, generative organs, pancreas and adrenals.

In the group "Bubonic plague with early septicaemia" are included cases which showed a mixed infection. In three cases the pneumococcus and the plague bacillus were isolated from the spleen: in another a streptococcus and the plague bacillus; in a third a streptococcus, *Bacillus mucosus capsulatis*, and the plague bacillus. These cases were associated with a soft, pulpy, diffluent spleen of dark colour.

The location of the buboes in the 75 cases was as follows:—Femoral 55, cervical 10, axillary 6, iliac 3 and popliteal 1. The study of the cervical buboes was of particular interest in view of the opinion held by some observers that the buccal mucous membrane forms one of the portals of entry of the plague bacillus into the body. In two of these cases the bubo was on the right side, in one case on the left, and in the remaining seven cases both sides were involved. In eight of the cases lesions were observed in the pharynx varying from simple oedema to marked pseudo-membranous pharyngitis and tonsillitis, but there was no evidence to show whether or not the glandular involvement was consequent upon primary pharyngeal infection. It is suggested that the pharyngeal lesion may be secondary to cervical buboes when the portal of entry of the infection is on the cutaneous surface. The following table shows the relation of the cervical buboes, pharyngeal lesions and focal pulmonary lesions:—

Cases with—	Number.	Associated Lesions.			
		Cervical buboes.	Pharyngeal lesions.	Focal pulmonary lesions.	None of preceding.
Cervical buboes ..	10	—	8	6	1
Pharyngeal lesions	11	8	—	7	1
Focal pulmonary lesions	13	6	6	—	5

The changes observed in the tonsils were very similar to those noted in primary lymphatic buboes, and attention is drawn to the fact that pharyngeal or tonsillar lesions may occur without specific pulmonary involvement. The sputum may be infective, not only in pulmonary bubonic cases with secondary pulmonary involvement, but also in cases of specific pharyngeal lesions.

Two cases of plague meningitis occurred in the series. The first was associated with a primary axillary bubo. No bacteria were found in smears from the spleen, glands and pus from the axilla, but smears

from pus obtained from the right lateral ventricle contained large numbers of organisms, proved to be *B. pestis* by subsequent experiment. In the second case the central lesions were associated with cervical retropharyngeal buboes, bronchopneumonia and acute parenchymatous degeneration of the viscera.

R. St. J. B.

Swellengrebel (N. H.). **Onderzoekingen over pestbesmetting buiten de ratten en hunne vlooien om.** [Enquiry concerning Plague Infection of Rats apart from their Fleas.]—*Geneesk. Tijdschr. v. Ned. Ind.* 1915. Vol. 55. No. 4. pp. 359–384. With 3 plates.

The general result of these experiments bears out the conclusions arrived at by the Indian Plague Commission, who conducted similar investigations during their researches on plague transmission. The chance of contact infection was found to be small, 1 out of 8 (12½ per cent.) guinea-pigs becoming infected by means of grossly contaminated urine rubbed on the surface of the abdomen, while 41 out of 43 control animals (95 per cent.) succumbed to a single inoculation test with infected *Xenopsylla cheopis*. When the floor of the cage had bene infected within 15 hours of the experiment and when the guinea-pigs were suffering from wounds in the feet or deep scarification of the abdomen infection always occurred. The same applied to new-born guinea-pigs, where infection took place through the umbilicus. All the food contamination experiments attempted proved negative, and no support could be found for the theory that plague may be carried over by ants. The experiments conducted by feeding rats on the bodies of their comrades who had died of plague were not numerous enough to justify conclusions, but the author is of opinion that this mode of infection must be very rare, under natural conditions.

R. St. J. B.

Blue (Rupert). **Plague Preventive Measures: their Development and Present Status.**—*Amer. Jl. Trop Dis. & Prevent. Med.* 1915. Nov. Vol. 3. No. 5. pp. 274–280.

"The keynote of present maritime quarantine procedure in respect to plague is the prevention of access of rodents to vessels and their destruction on board ship, and it is now recognised that a human case aboard ship or fomites are of little or no moment in the transmission of the disease from seaport to seaport."

The whole question of plague prophylaxis is bound up with the destruction of rodents. It has been ascertained that as soon as the rodent population has been reduced by 65 per cent. human plague ceases, although the epizootic among the rats may be still subsisting.

"In view of the world-wide distribution of plague, and its adverse effect on commerce, it would seem a matter of urgent importance for seaports especially so to change their type of architecture and building materials as to erect permanent barriers against the ingress of rodents. The opportunity to do so has been greatly increased in recent years by the enormous development of the cement industry. In fact, building operations have been practically revolutionized."

R. St. J. B.

Markl (J. G.). **Ueber Saureagglutination von Pestbacillen.** [Acid Agglutination in Plague.] –*Cent. f. Bakt.* 1. Abt. Orig. 1915. Sept. 8. Vol. 77. No. 1. pp. 102–108.

This communication is concerned with the question of specific acid agglutination with various strains of plague, and as to how far such agglutination can be considered as an aid to the identification of the organism.

The solutions of acetic acid and sodium acetate containing the falling concentrations of hydrogen-ions were composed according to the well-known formula $H. = \frac{\text{acid}}{\text{alkaline salt}} .K$, where K is the disassociation constant for the acid in question (for acetic acid $K = 1{,}8. ^{10-5}$).

0·6 cc. of a three days old plague culture in 7 cc. distilled water were added to 0·3 cc. of the reagent containing the appropriate concentration of H-ions in each of ten tubes. The tubes were then placed in the incubator and examined after periods of 20, 40, and 60 minutes, and subsequently after 6 and 24 hours at the room temperature. It was found that the optimum specific effect was obtained after one hour's incubation. Six strains of pest were employed in pure culture; the results obtained are shown in the table on page 179.

It thus appears that most strains of plague show the optimum agglutination in tubes 4 and 5.

In the next series (p. 180) are shown the agglutination effects with two plague-like organisms isolated from pneumonic plague sputum, *B. pseudotuberculosis rodentium*, *B. Danysz*, *B. avicida* and *B. proteus*.

It is clear that "Pseudo-pest I" and *B. pseudo-tuberculosis rodentium* gave exactly the same zone of agglutination as *B. pestis* itself, the optimum effect being observed in tubes 4 and 5. These organisms cannot therefore be distinguished from plague bacilli by means of acid agglutinations. The other organisms are easily separated—*B. avicida*, for example, which also agglutinates in tube 5, giving agglutinations in the tubes containing higher concentrations of H-ions (tubes 9 and 10). *B. typhi murinum*, *B. suicida* and *B. pecum* (Friedländer) did not give any agglutination with the series in question.

R. St. J. B.

Berlin (H.) **Die Serodiagnose der Pest mit Hilfe der Präzipitations-Methode nach Ascoli.** [Sero-Diagnosis of Plague by Means of Ascoli's Precipitation Method.]—*Cent. f. Bakt.* 1. Abt. Orig. 1915. Feb. 15. Vol. 75. No. 5/6. pp. 467–485.

The precipitations were carried out with an antigen prepared from the plague infected organs, the organ pulp being mixed with 5 to 10 times its volume of normal salt solution, heated in the water bath and then filtered till quite clear. Equally good results were given with distilled water. The agglutinating serum used was obtained from the Pasteur Institute and was employed in a dilution of 1–200. The precipitation tubes were incubated at 37° C. and examined for precipitation zoning after 5 and 30 minutes respectively. When the reaction was positive a cloud ring was formed at the junction of the

[Markl (J. G.)] Plague cultures.—Laboratory strains. Observation time 1 hour's incubation.

Tube.	Approximate H-ion concentration.	Strain "Amphitrite."	Strain "Trieste."	Strain 'Gaspich."	Strain "Sponza."	Strain "59."	Strain "Vladessich."
1	1.10^{-5}	0	0	0	0	0	0
2	2.10^{-5}	0	0	0	0	0	0
3	4.10^{-5}	0	0	0	trace	trace	trace
4	8.10^{-5}	distinct (Opt.)	Opt.	marked (Opt.)	almost complete	Opt.	marked (Opt.)
5	$1{,}6.10^{-4}$	,,	,,	,,	complete	,,	,,
6	$3{,}2.10^{-4}$	0	distinct	0	,,	distinct	,,
7	$6{,}4.10^{-4}$	0	0	0	,,	0	0
8	$1{,}3.10^{-3}$	0	0	0	distinct	0	0
9	$2{,}6.10^{-3}$	0	0	0	0	0	0
10	$5{,}2.10^{-3}$	0	0	0	0	0	0

[Markl (J. G.)] Plague-like organisms. Observation time 1 hour's incubation.

Tube.	Approximate H-ion concentration.	Pseudopest I.	Pseudopest II.	*B. pseudo-tuberculosis rodentium.*	*B. Danysz.*	*B. avicida.*	*Proteus.*
1	1.10-5	0	0	0	0	0	0
2	2.10-5	0	0	0	0	0	marked.
3	4.10-5	marked	0	slight	0	0	Opt.
4	8.10-5	complete	0	marked	0	slight	0
5	1,6.10-4	,,	0	,,	0	marked	0
6	3,2.10-4	,,	0	,,	0	,,	0
7	6,4.10-4	,,	marked	0	slight	,,	0
8	1,3.10-3	almost complete	,,	0	marked	,,	0
9	2,6.10-3	0	,,	0	,,	,,	0
10	5,2.10-3	0	distinct	0	,,	slight	0

antigen and serum in the tubes. The antigen was present in the organs of animals dead with either natural or artificial infection, and the reaction occurred with fresh as well as with putrid organs; in the latter case, however, with less frequency. The intensity of the cloud was found to be commonly dependent on the amount of plague bacilli contained in the organ. Concentrated serum and extract are necessary for the satisfactory demonstration of the reaction, as negative or doubtful results are apt to arise when dilutions of antigen or antibody are employed.

The reaction is not specific; positive results were sometimes obtained with the controls containing extracts of the organs of normal healthy animals (rat and guinea-pigs). For this reason the new method cannot take the place of the ordinary methods of bacteriological diagnosis of plague, and can only be regarded as means of additional investigation.

R. St. J. B.

Dudtschenko (I. S.). **Ueber die Bedingungen welche Polfärbung, Polymorphismus und ein eigentümliche Art von Involutionsformen bei den pestähnlichen Bacillen hervorrufen.** [The Conditions which determine Polarstaining, Polymorphism and Involution Forms among Pseudo-Plague Bacilli.]—*Cent. f. Bakt.* 1. Abt. Orig. 1914. Dec. 10. Vol. 75. No. 3. pp. 264–272.

An organism resembling Pfeiffer's "Kapselbacillus," previously isolated from white rats, was used in these experiments. Under favourable conditions for development, a very delicate continuous endo- and ecto-plasm could be demonstrated, but with the occurrence of unfavourable conditions for development in the medium (e.g. incubation for 10 to 12 days at 1–2° C.), the outer part of the ectoplasm forms into a firm capsule, which serves the organism as a means of protection against adverse influences. The capsule acts probably as a dialysing membrane between the cell contents and the surrounding medium and is responsible for the increase of intracellular pressure observed. This increase of pressure leads on the one hand to the formation of the pleomorphic attenuated form of the bacillus, and on the other hand to the displacement of the endoplasm towards the poles of the bacterial cell. Continuous pressure leads to the formation of the various misshapen involution forms met with.

R. St. J. B.

Wherry (W. B.). **A Plague-like Disease of Californian Ground Squirrels affecting Man in Ohio.**—*Jl. Amer. Med. Assoc.* 1915. Oct. 30. Vol 65. No. 18. p. 1549.

This contains an abstract of a discussion on a paper read by Wherry before the Section on Preventive Medicine and Public Health, American Medical Association, San Francisco, June, 1915, dealing with the plague-like disease of rodents (due to *B. tularense*) described originally by McCoy and Chapin, and subsequently by Wherry and Lamb, who isolated the specific organism from two human cases. These cases were characterised by ulcerative conjunctivitis involving the

palpebral conjunctivae, accompanied by lymphadenitis of the pre-auricular and cervical glands on the corresponding side, a high temperature and marked prostration. Wherry is of opinion that the virus might possibly produce other lesions in man besides conjunctivitis and lymphangitis.

"Human beings might be infected by way of the gastro-intestinal tract and through abrasions of the skin. The virus might give rise to some forms of rhinitis, sore throat, and tonsillitis. Those are the possibilities. I am not at all certain that the virus is virulent enough to produce septicaemia in man. Unfortunately we did not avail ourselves of the opportunity that we had to test that. We should have drawn off some peripheral blood to see if the virus were circulating or not. In one case we took blood rather late, and the results were negative. It seems that the virulence of the virus is diminished by passage through man. Guinea pigs inoculated directly from a human being died after six or seven days; and in three or four days when it came from another guinea-pig; so apparently the virulence is slightly diminished for rodents by passage through man."

R. St. J. B.

LEPROSY.

Barbézieux (G.). **Enquête sur la lèpre tonkinoise, géographie-statistiques.**—*Bull. Soc. Med. Chirurg. Indochine.* 1914. Dec. Vol. 5. No. 10. pp. 408–422.

This paper discusses the question of leprosy in the Province of Thai-binh, Tonkin. The author lays particular stress on the nature of the soil, the climate and the existence of rivers and gives elaborate tables and statistics illustrating their relation, still mysterious, to the distribution of leprosy in the country. The conclusions he arrives at are as follows :—

1. In a population of 945,595 inhabitants, all of the Annamite race, the province of Thai-binh contains at the most 300 lepers [154 are in the asylums], i.e., 3 to 4 per 10,000 inhabitants.
2. Leprosy in the interior of the province is met with principally in the neighbourhood of rivers, not immediately on their banks but rather in the middle of the bends and curves which they form and in the centre of the districts which lie between the streams.
3. Contrary to the general opinion that leprosy is a malady of the coast, it is rare in the regions bordering the sea.
4. Leprosy does not appear to be disseminated in the province by direct or indirect contagion or by heredity. It is not brought from one centre to another, for the lepers rarely leave their original villages ; it seems to be *born* and to *develop in the place* under conditions we do not yet know, but which seem to be favoured by the configuration of the ground determining the waters and their drainage.
5. The great majority of the lepers belong to the poorer class, although we cannot invoke poverty as an immediate cause of leprosy.
6. The incomplete nerve-forms of leprosy are those most frequently observed in Thai-binh and this is generally the case throughout Tonkin.

P. S. Abraham.

de Azevedo (Paes). **O exame do mucco nasal na pesquiza do bacillo de Hansen.** [Examination of Nasal Mucosa for Hansen's Bacillus.] [With summary in French].—*Arch. Brasil. Med.* 1915. June–July. Vol. 5. No. 6–7. pp. 231–251.

With the object of discovering commencing cases of leprosy, the author examined 59 individuals who lived among lepers in Brazil ; but in no case did he ever find Hansen's bacillus in the nasal mucous membrane. In a few of them he observed swollen glands, but on puncturing these he never found acid-resisting bacilli. He further examined methodically and with care 548 persons, some in good health, others suffering from various complaints ; but there were no acid-resisting bacilli in the nasal mucous membranes, except in one young girl with scarlatina. The bacilli were grouped in large masses and with difficulty a pure culture was obtained of bacilli which had no analogy with those discovered and isolated by Karlinski in similar circumstances. As the result of these observations in a country where leprosy is so common, the author disagrees with Sticker's theory that there is an initial nasal chancre in Hansen's disease.

P. S. A.

Neve (A.). **A Case of Leprosy diagnosed by X Rays** —*Brit. Med. Jl.* 1915. Dec. 4. p. 814. With 2 text-figs.

An Indian soldier in the Kitchener Hospital, Brighton, was invalided in April 1915 for supposed rheumatism, headache and other ill defined pains; there was a widespread papular rash with some pigmentation of the face—stated to be of many years' duration. The left eye had been operated upon four years ago for pterygium and there was slight corneal opacity with conjunctival injection. On arrival the face was swollen—attributed to exposure in the trenches.

There was a little clubbing of the fingers, and slight shortening of the toes, one being crooked. There were no maculae on the back or extensor surfaces; no tubercles on eyebrows, ears or elsewhere; no anaesthetic patches on limbs or body; no thickening of the ulnar nerve; no nasopharyngeal ulceration or laryngeal symptoms; and no paresis of lower eyelids.

Radiograms, however, showed entire disappearance of the terminal phalanges and most of the toes with much decalcification of the proximal phalanges and thinning of the distal part of the metatarsal bones; in the fingers, slight changes were perceptible in all the terminal phalanges.

"It is seldom that a case with slight and doubtful general symptoms shows such extensive osseous changes as to make them the decisive diagnostic factor. Hence the value of the Roentgen rays in this case was peculiar."

P. S. A.

Jerusalémy. **Myxodème et lèpre.**—*Presse Méd.* 1915. May 20. Vol. 23. No. 22. p. 174.

The author has seen several cases of leprosy in the provinces of Honan and Kiangsu in China showing points of diagnostic interest. A Chinaman, aged 16, presented the symptoms of myxoedema with atrophy of the thyroid, but no macules, pigmentary patches or nodules, or anything symptomatic of leprosy. There was hyperaemia of the nasal mucous membrane and, after giving potassium iodide, Hansen's bacilli were found in the nasal mucus. Both the father and the mother were lepers. The boy complained of general malaise and pains in the joints; thyroid treatment was of no avail, but the symptoms were relieved by alternate doses of chaulmoogra and eucalyptol.

P. S. A.

Gomez (Enrique). **La lepra es curable.** [Leprosy is Curable.]—*Rep. de Med. y Cirug.* 1915. Nov. Vol. 7. No. 2. (No. 74). pp. 68–72.

Notes of four cases of leprosy, two being described at length, which after a residence at the leper-hospital of Agua de Dios at Bogotá, lost all signs of the disease. Injections of chaulmoogra oil were used in one of the cases for a period of 18 months, but the nature of the treatment in the other case is not mentioned. The author goes on to remark that the sanitary conditions in the leper hospital referred to are deplorable, and he believes that if they were improved, cases of recovery would be less uncommon. He points out that ankylostomiasis and malaria, by the anaemia which they cause, are potent agents for evil in the case of lepers. More lepers die of tuberculosis than of leprosy in this hospital.

J. B. Nias.

Ribas (Emilio). **Prophylaxia da Lepra.** [The Prevention of Leprosy.] —*Ann. Paulistas de Med. y Cirurg.* 1915. Nov. Vol. 5. No. 5. pp. 381–394. With 2 plates.

A memoir advocating the establishment of leper colonies in Brazil on the lines of those established in the Sandwich Islands, preferably on one or more islands off the coast of Brazil. The provisions of Brazilian law, as it stands at present, appear to be quite insufficient for grappling with this problem. Charitable institutions exist in Brazil for the treatment of lepers, but the patients can enter and leave at their own pleasure, without the possibility of detaining them.

J. B. N.

Federated Malay States. **Fourteenth Annual Report of the Institute for Medical Research, Kuala Lumpur, Federated Malay States, 1914.** (Henry Fraser, M. D., Aberd., Director.)—1915. Kuala Lumpur: Printed at the F.M.S. Govt. Printing Office. [Leprosy, pp. 6–51.]

Fish and Leprosy.—An attempt to cultivate the leprosy bacillus on media prepared from preserved fish seemed worthy of trial; a positive result would demonstrate the possibility of preserved fish being a vehicle for the conveyance of the infection. Numerous experiments were made with "belachan" (dried prawns pounded with salt), "ikan tenggeri" and "ikan slangin" (common forms of salted fish), and dried cuttlefish. At the close of the year there was in no case evidence of growth, or proliferation of bacilli, pieces of leprous tissue and emulsions of the same being used.

Leprosy and animals.—During the year 25 inoculation experiments were performed, making the total up to 70—rabbits, guinea-pigs, rats, goats, cocks, fish, and toads being employed. The details of experiments are tabulated; in some cases portions of leproma, in others emulsions were inoculated. In no case has proliferation of bacilli been observed; some of the animals were alive and well after an interval of 17 to 21 months.

Leprosy and Kedrowsky's bacillus.—A full account of the attempts to confirm Kedrowsky's and Bayon's results is given, as well as experiments with "Bacillus phlei" and Karlinski's bacillus. [Drs. Fraser and Fletcher's conclusions that Kedrowsky's bacillus is not the "leprosy bacillus," and that the latter has not yet been cultivated, have been reiterated in papers already abstracted in this *Bulletin*, Vol. 6, pp. 126 and 407.]

The Wassermann and Luetin Reactions in Leprosy.—[Dr. Fletcher's Report is also already abstracted in this *Bulletin*. Vol. 6. p. 408.]

P. S. A.

Bayon (H.). **The Artificial Cultivation of Hansen's Bacillus.**—*Ann. Trop. Med. & Parasit.* 1915. Dec. 30. Vol. 9. No. 4. pp. 535–538.

Dr. Bayon, whilst admitting the importance of Fraser and Fletcher's negative experiments, points out that similar negative series of experiments have attended the isolation and cultivation of other acid-fast micro-organisms, which have eventually succeeded.

As regards the transmission of leprosy to animals, he observes that "whether one injects ground-up nodules or Kedrowsky's culture, in the great majority of cases the bacteria get simply eliminated, without leaving any visible trace. In single rare instances, they produce bacillary deposits similar to those found in the inner organs of lepers." "We cannot expect skin lesions in animals inoculated with leprosy: all we can hope for are discrete deposits in the inner organs. If they can be transmitted through some generations and persist for a considerable time, and the bacillary deposit is superior to the quantity injected, then it seems to me that by all the laws of experimental medicine the inoculation has succeeded. This is the case with one experiment fully described in my paper."

He further maintains that "it cannot be too often repeated that the scanty positive results obtained in the experimental study of leprosy are absolutely in keeping with what we know of the clinical features of the disease, its low and eminently capricious infectivity; but that here more than when dealing with any other disease, the partial and incomplete interpretation of hundreds of negative observations cannot invalidate the proof positive of a single successful inoculation."

P. S. A.

Sutherland (W. D.) & Mitra (G. C.). **The Wassermann Reaction in Malaria, Kala-Azar and Leprosy.**—*Indian Jl. Med. Research.* 1915. Apr. Vol. 2. No. 4. pp. 984–989.

The authors review the work of other observers and record their own results in India.

Leprosy.—Thirty-four cases were examined, 32 being inmates of the Purulia Asylum. Fourteen were of the anaesthetic form, and of these, 4 gave a positive and 10 a negative reaction. Of the remaining 20, 7 were positive and 13 negative.

Summing up their own results and those of a number of other investigators, it would appear that about 50 per cent. of lepers give positive reactions, 36 per cent. of anaesthetic and 64 per cent. of nodular and mixed cases.

P. S. A.

Stanziale (R.). **Neue Untersuchungen über die experimentellen leprösen Läsionen des Kaninchenauges.** [Fresh Experiments on the Production of Leprous Lesions in the Rabbit's Eye.]—*Cent. f. Bakt.* 1. Abt. Orig. 1915. Mar. 13. Vol. 75. No. 7. pp. 498–507. With 2 plates & 2 text-figs.

The author reports the results he has obtained during the last four years in the inoculation of rabbits with leprous material. He found that the injection of ground-up nodules gave no results and therefore tried small pieces of lepromas inserted under the cornea.

After numerous experiments he found that only very few animals developed lesions which could be transmitted to the third generation. With care, however, 42 to 75 per cent. could be inoculated in the first generation, but of these only 25 to 40 per cent. developed the disease sufficiently to be transferred to other animals.

After many failures he obtained from nodules in the eye of one of these rabbits a culture of an acid-fast micro-organism which he considers similar to the bacillus isolated by KEDROWSKY. Its injection into monkeys, rabbits, guinea-pigs and mice produced no leprotic lesions.

P. S. A.

PIMPINI (Antonio). **La cirrosi molle del fegato dei leprosi e le manifestazioni senza bacillo leproso in alcune forme di lepra ereditaria.** [The Soft Cirrhosis of the Liver of Lepers, and the Non-bacillary Manifestations of Leprosy of Hereditary Type.]—*Giorn. Ital. d. Malat. Ven. e della Pelle.* 1915. Oct. 7. Vol. 56. An. 50. No. 4. pp. 281–295. With 3 text-figs.

This paper is in the main an exposition of the views held by Professor CAMPANA of Rome on the subject of leprosy, by one of his pupils. A list of 13 papers by Professor CAMPANA on the subject of leprosy, of dates ranging from 1881 to 1908, is appended. The specialist in leprosy may find something of interest to read in this memoir, but the histological details dealt with are on the whole rather minute and apparently of minor importance. For the general reader the paper is insufficiently illustrated.

J. B. N.

VOERNER. **Zur Kenntnis der Zaraath, des alttestamentlichen Aussatzes.** [Zaraath, the Leprosy of the Old Testament.]—*Dermatol. Zeitschr.* 1915. Aug. Vol. 22. No. 8. pp. 470–478.

The author discusses this question in a very elaborate manner, referring to the theories of many writers as to the identity of the Biblical "Zaraath"—e.g. PROKHOROFF and ZAMBACO Pasha that it was "true leprosy"; HEBRA, "scabies"; CALMET and MÜNCH, "vitiligo"; ROLLET and HAMMONIE, "psoriasis"; DUBREUILLE and BARQUES, a number of skin diseases grouped by Hippocrates under the name "lepra."

The author has come to the conclusion that the disease described in the Old Testament comes under none of the above, but that it referred to an exfoliative dermatitis *sui generis*, which existed as an epidemic for more than 500 years, and has since become extinct.

[No reference is made to the views of McEWEN and UNNA. who have shown that the word "Zaraath" had rather a theological than a medical meaning. See abstract of Dr. MONTGOMERY'S interesting paper in this *Bulletin*, Vol. 6, p. 401.]

P. S. A.

MISCELLANEOUS.

CHRISTOPHERS (S. R.) & KHAZAN CHAND. **Notes on some Anophelines from Arabia and Mesopotamia.**— *Indian Jl. Med. Research.* 1915. July. Vol. 3. No. 1. pp. 180–200. With 2 plates.

The following is a list of anophelines from the Aden Hinterland and lower Mesopotamia, the fourth column giving the synonymy which the authors believe to be correct.

PATTON.	THEOBALD.	EDWARDS.	Authors.	Locality.
A. arabiensis Patton	*A. wellcomei* Theo.	*A. costalis* Theo.	*A. costalis* Theo.	Aden.
A. d'thali Patton	Near *A. nili* Theo.	..	*A. rhodesiensis* Theo.	Aden. Muscat.
A. tibani Patton	Near *A. theobaldi* Giles.	..	*A. pretoriensis* Theo.	Aden.
A. jehafi Patton	*A. cinereus* Theo.	*A. cinereus* Theo.	*A. cinereus* Theo.	Aden.
A. azriki Patton	..	Near *A. multicolor* Camboulin	*A. turkhudi* Liston	Aden.
			A. culicifacies Giles	Aden. Muscat.
			A. funestus Giles	Muscat.
			A. stephensi Theo.	Lower Mesopotamia.
			A. pulcherrimus Theo.	
			A. sinensis var. mesopotamiae n.s.	

They point out that the Arabian anopheline fauna is markedly African in character.

These species are described, some at length with notes on habits and discussions on synonymy, others briefly. Plates illustrate *A. sinensis* var. *mesopotamiae*, *A. rhodesiensis*, *A. funestus* var. *arabica*, *A. listoni* and a variety thereof.

There is appended a "Variability chart for certain characters in 81 specimens of the *A. sinensis* group."

A. G. B.

Strickland (C.). **Note on *Anopheles brevipalpis* Roper, and Description of its Egg and Larva.**—*Indian Jl. Med. Research.* 1915. July. Vol. 3. No. 1. pp. 201–204. With 1 plate.

The author has found at the seaside near Selangor, F.M.S., an anopheline which, though it differs in one respect, he believes to be the same as that described by Roper from Borneo as *A. brevipalpis*. It has a culicine attitude, feeds readily on man, and may prove to be a malaria carrier. He here describes with figures the egg and young larva. It is a member of Christophers' protanopheline group but its exact position therein is doubtful. It is therefore made a new genus, *Memnemyia*, the definition of which is given.

A. G. B.

Stanton (A. T.). **The Larvae of Malayan Anopheles.**—*Bull. Entomol. Research.* 1915. Sept. Vol. 6. Pt. 2. pp. 159–172. With 15 figs.

It has been stated, the author writes, that in anopheline larvae the characters are not sufficiently constant to be reliable for the identification of species.

"Recent studies have shown, however, that those differences which were formerly believed to be variations in the larva of a single species, are in reality changes of a constant kind associated with successive phases of its growth and that there is a high degree of constancy in the specific characters of larvae at identical stages of growth. In the examination of many thousands of Anopheline larvae taken in the Malay Peninsula and neighbouring islands, it has been possible to recognise with certainty the larvae of most of the species found in this region. A certain assemblage of characters is diagnostic of the species."

The characters of importance in this respect are "the form and relative position of certain appendages of the cuticle, hairs and similar structures, designed to subserve functions of sensation and the maintenance of position at the water surface for breathing and feeding." The growth changes in anopheline larvae are then described with figures and the remainder of the paper is occupied by descriptions and illustrations of the salient features of the mature forms of known larvae, a method of identification of species being indicated by a synoptic table. The larvae described are those of *A. aconitus* Dönitz (=*albirostris* Theo.); *A. aitkeni* James; *A. asiaticus* Leic.; *A. barbirostris* Van der Wulp; *A. fuliginosus* Giles; *A. karwari* James; *A. kochi* Dönitz; *A. leucosphyrus* Dönitz; *A. maculatus* Theo.; *A. rossi* var. *indefinitus* Ludl.; *A. sinensis* Wied.; *A. tessellatus* Theo.; *A. umbrosus* Theo.

A. G. B.

Macfie (J. W. Scott). **Observations on the Bionomics of *Stegomyia fasciata*.**—*Bull. Entomol. Research.* 1915. Dec. Vol. 6. Pt. 3. pp. 205–229.

An interesting paper which will be read in full by those who are concerned with this mosquito. The author's studies were made in the laboratory. The sequence of events relating to blood feeding and the laying of eggs was as follows:—

"On the second or third day after emergence from the pupa the mosquito takes her initial feed of blood. If she has previously been fertilised she lays her first batch of eggs on the sixth or seventh day, and is ready to

feed again on blood a few hours later. Thereafter she lays eggs regularly every third or fourth day, and feeds on blood once only after each batch is laid in preparation for the next batch. The female continues to lay batches of eggs throughout her life, and in this way at least fifteen may be deposited. In order that eggs may be laid at all, both fertilisation and a meal of blood are required, and it is necessary that the fertilisation should precede the blood feed. Once fertilised, the female may continue to lay batches of fertile eggs for at any rate 37 days without being reimpregnated. If the eggs are laid in the early morning, she feeds during the day-time; if in the afternoon or evening, she feeds at night; but sometimes she refuses an offer to feed in daylight in favour of the next opportunity to feed in the dark."

Twelve pages of tables are given in support of these conclusionss The author noticed that the development of his larvae, bred in glas. bottles, was apt to be arrested. Such larvae appeared to be fully mature and to the naked eye looked quite healthy. Some under observation had been in the larval stage for over three months. In one case the mosquito hatched 100 days after the receipt of the larva. The cause of the delay has not been ascertained; fouling of the medium is suggested.

More experiments were made on the action of common salt on the larvae [this *Bulletin*, Vol. 4, p. 164]. These, which are detailed, "seem to prove that the female *S. fasciata* either will not lay her eggs on 2 per cent. salt solution even when no alternative breeding place is offered to her, or if her natural instinct compels her to do so, the eggs thus laid are rapidly killed by the solution and no larvae result." In less saline media the development of the mosquitoes appeared to be accelerated over the normal.

A. G. B.

MacGregor (Malcolm Evan). **Notes on the Rearing of** *Stegomyia fasciata* **in London.**—*Jl. Trop. Med. & Hyg.* 1915. Sept. 1. Vol. 18. No. 17. pp. 193–196.

In May of 1915 the author received some dried leaves of the West African cotton-wood tree on which were eggs of *S. fasciata*. The leaves had been sent from Sierra Leone three and a half months before, and were in a thoroughly desiccated state. They were placed in tap water at 18° C. and next day the water was crowded with larvae, from which adults have been reared to the sixth generation. Similar observations have been made by Theobald and by Newstead. A number of observations on the life history and habits of these mosquitoes are here detailed for which the paper must be consulted. The author draws attention to the further demonstration of the resistance of the eggs to drying and to the bearing on the spread of yellow fever.

"It is clearly conceivable that dried leaves with eggs attached might, by wind alone, be spread over immense distances, while by export of raw materials in bales of all sorts, dried leaves with the eggs adhering could very well be distributed to the ends of the earth. Moreover, the hardiness of *S. fasciata* would permit of its establishing itself in many places where it is not found to-day, and with the vector of yellow fever present, the living virus—if such it prove to be—need only be introduced into the infested area, for the danger of an epidemic to be made manifest."

A. G. B.

Stanton (A. T.). **Notes on Sumatran Culicidae.**—*Indian Jl. Med. Res.* 1915. Oct. Vol. 3. No. 2. pp. 251–258.

Dr. Stanton has examined the mosquitoes collected in Sumatra by the Robinson-Kloss Expedition in 1914 and also collections forwarded by Schueffner from the Deli, Lampongs, and Batak-Highlands districts. It has been hitherto believed that the mosquito fauna of Sumatra and that of the Malay Peninsula differ considerably; this is partly owing to the fact that the same mosquito has been described under different names by Doenitz and Theobald respectively. The author gives a list of species with notes on synonymy. Of 19 species of anopheles in the Malay Peninsula twelve occur also in Sumatra and the remaining species are rare in the Malay Peninsula.

The anophelines are:—*A. aconitus* Dön., *A. albotaeniatus* Theobald, *A. barbirostris* Van der Wulp, *A. fuliginosus* Giles, *A. kochi* Dön., *A. leucosphyrus* Dön., *A. ludlowi* Theobald, *A. maculatus* Theobald, *A. rossi* var. *indefinatus* Ludlow, *A. schuffneri* Stanton, *A. sinensis* Wiedemann, *A. tessellatus* Theobald, *A. umbrosus* Theobald.

A. aconitus Dön. is the same as *M. albirostris* Theobald; Dönitz's name has priority. Fifteen species of the tribe Culicini were included in the collections and two of the tribe Sabethini. A. G. B.

Halberkann (J.). **Ueber Schutzmittel gegen Stechmücken.** [Protection against Mosquitoes.]—*München. Med. Woch.* 1915. Oct. 12. Vol. 62. No. 41. p. 1407.

The author refers to a paper in which *Pyrethrum roseum* is recommended as a protection against mosquitoes. He describes some experiments made at the Institut fur Schiffs und Tropenkrankheiten at Hamburg, in which a strong tincture of pyrethrum painted on the arm quite failed to deter *S. fasciata* from biting. He believes that none of the odorous substances recommended are of use and that it is necessary to employ a substance which stops the opening of the tracheae. Such a substance is that recommended by Giemsa in a series of papers and known as "Mückenfluid," which has proved useful in Germany as well as in the tropics; it is sprayed by an apparatus. The fluid at first contained pyrethrum, but now consists of a $2\frac{1}{2}$ per cent. solution of potash soap, or a $1\frac{1}{2}$ per cent. solution soda soap or, better still, a mixture of 50 gm. formalin with 18 gm. spir. sap. kalin. in two litres of water [see this *Bulletin*, Vol. 2, p. 339]. A. G. B.

Lima (A. da Costa). **Acção do pyrethro sobre os mosquitos.** [The Action of Pyrethrum on Mosquitoes.]—*Brazil Med.* 1915. Oct. 2. Vol. 29. No. 37. pp. 289–291.

The author finds by experiment that the quantity of pyrethrum powder necessary to kill mosquitoes with certainty, when burnt in rooms, should not be less than 15 grammes for every cubic metre of space in a room, the room being closed for not less than three hours, and the roof, in case of apartments without ceilings, being covered with a cloth of canvas or cotton. When only 10 grammes of powder per cubic metre are employed the result is not certain. The powder must be burnt in vessels on the floor.* J. B. Nias.

* Boyce recommended 3 lb. of pyrethrum to 1,000 cubic feet.

d'Anfreville (L.). **Note historique à propos des moustiques agents de transmission des maladies.**—*Bull. Soc. Path. Exot.* 1915. Oct. Vol. 8. No. 8. pp. 594-595.

The author has taken from a French report of the year 1818 a passage to the effect that the Europeans who were to proceed inland on an expedition from S. Louis were provided with pieces of cloth (*pièces de toile*) to protect them from mosquitoes, it being generally recognised that the insomnia caused by the bites of these insects was was one of the principal causes of death among whites on the Senegal river.

A. G. B.

Castellani (Aldo) & Jackson (Thomas W.). **Notes on Certain Insecticides.**—*Jl. Trop. Med. & Hyg.* 1915. Nov. 15. Vol. 18. No. 22. pp. 253–255.

The experiments of which the present paper treats were carried out in Serbia on body-lice, bed bugs, fleas, head-lice and crab-lice.

"The technique for solids was as follows: Small tin boxes with loose-fitting lids, easily removable, were used. In these boxes were placed the substances to be tested and the living lice or bed-bugs. In the case of fleas, small transparent glass dishes, resembling Petri dishes, were used, as the tin boxes were found unsuitable, the fleas jumping out of them upon opening. Every few minutes the insects in the boxes or glass vessels were inspected and the degree of activity or the death of the insects was noted, with the elapsed time of exposure. The experiments were all carefully controlled. The controls lived for days, more than six days, and were entirely unaffected by simple captivity, so far as could be observed."

It was noted that lice and fleas plunged into a little vaseline died an instantaneous death and that bed bugs died within one to three minutes. The question is raised whether the sulphur and mercurial salts present in ointments generally used for killing lice are not superfluous. The action of lard and lanoline is similar to that of vaseline.

Of gaseous insecticides steam, hot air, and sulphur fumes were employed. Steam was found to kill both lice and their eggs under proper conditions of exposure in a very few minutes. The loss of the characteristic glossy colour of the lice eggs is evidence of death. Clothing must be loosely piled or hung up to permit the necessary penetration and exposure. Sulphur fumigation cannot be depended on to kill the eggs of bed-bugs and lice, though it is highly effective against the insects themselves. Repeated fumigation is therefore necessary.

The authors' conclusions are as follows:—

"(1) In regard to solid and liquid insecticides, the substances which we have found to be deleterious to body-lice (*Pediculus corporis* de Geer 1778) are, in the order of their efficiency: Kerosene oil, vaseline, guaiacol, anise preparations, iodoform, lysol, cyllin and similar preparations, carbolic acid solution, naphthaline, camphor.

"Pyrethrum has a very feeble action on lice, while boric acid, sulphur, corrosive sublimate, and zinc sulphate, when used in powder form, have apparently no action whatever. As regards bed-bugs, kerosene oil is the best insecticide. Next to it comes guaiacol, one of the most active drugs of those we have tried.

"(2) Substances which are powerful licecides may have very little or no action upon bed-bugs, and *vice versa*. For instance, iodoform which kills lice within ten to fifteen minutes has practically no deleterious action on

bed-bugs, which may live for more than twenty-four hours when exposed to it. It has also very little effect on fleas. Pyrethrum, on the other hand, has a much more powerful action on bed-bugs than on lice.

" (3) For use against lice on a large scale, as among troops and prisoners, perhaps the best insecticide powder is naphthaline. This substance has a lower licecide action than kerosene oil, guaiacol, iodoform and anise preparations, such as onethol, but it has a less displeasing odour than the first three named, and is much cheaper than onethol powder. In stored blankets and clothing it is also practicable and of use, as frequently lice are found upon the clothing and blankets stored through the summer. Naphthaline is useful also for its well-known deterrent action upon moths. We are speaking here of insecticide powders. As regards liquid insecticides, the American Red Cross Sanitary Commission gave sanction to kerosene by its daily use upon troops and prisoners.

" (4) For the better class of patients in practice a menthol powder is to be preferred to naphthaline in most cases, as its odour is not displeasing, while it is repellent to mosquitoes, in addition to lice and fleas. Such powder is especially useful in summer and in hot countries, as it has a cooling effect on the skin and often prevents prickly heat."

[The authors experimented with powdered precipitated sulphur by itself and mixed with sebaceous human secretion. In each case the result was nil. In Dr. SHIPLEY'S " Minor Horrors of War," pp. 18 and 19, there is evidence that sulphur rubbed into the clothes or in bags worn next the skin is effective against lice.]

A. G. B.

SWELLENGREBEL (N. H.). **Eenige opmerkingen over de bestrijding der kleederluizen.** [Observations on the Destruction of Clothes Lice.]—*Nederl. Tijdschr. v. Geneeskunde.* 1915. Vol. 2. No. 15. pp. 1734–1760. With 1 plate, 1 table & 17 text-figs.

This is one of the numerous papers which are appearing at the present time on the subject of the clothes-louse in connection with typhus fever. It contains a good series of photographs illustrating the development of the insect, and considers in detail the various methods which have been proposed for destroying both the louse and its eggs. From the table given on page 1750 it would appear that exposure to ammonia gas in a closed receptacle is by far the most certain means of destroying the vitality of the eggs.

J. B. N.

LEGROUX (R.). **Sur la destruction des poux.**—*Bull. Soc. Path. Exot.* 1915. July. Vol. 8. No. 7. pp. 470–473.

The author has tested coal tar derivatives and essential oils on the clothes-louse at ordinary temperature (16°), and at 33°, the temperature of the underclothing. The experiments were always made an hour after the lice had fed. The resistance to parasiticides varies according to age, so that, as far as possible, he always used four adults, two lice aged 6–7 days, and four large females. They were put in a bell glass of 2,000 cc. near one point of the circumference on a piece of tissue paper; on the opposite point of the circumference a drop of the liquid to be tried was placed on another piece of paper and the bell glass replaced. As soon as the insects no longer moved and lay on their backs the paper on which the liquid had been placed was taken out and the bell glass closed again. Observations were then kept up

through the glass every half an hour for five hours and then hourly to the 12th hour. A table gives the results at the two temperatures. The author advises the following mixture :—

Lemon grass	aa. 300 cc.
Essence of mint ..	
Essence of eucalyptus	
Powdered naphthalene..	100 grams.

The lemon grass is obtained from *Andropogon citratus*, the eucalyptus from *E. globulus*, and the mint from *Mentha pulegium*.

For the treatment of garments small pieces of felt or thick cloth 2 cm. square and soaked in the mixture are pinned at various points. If the man has to get back into his clothes a more rapid method must be employed :—(1) Ironing by means of a hot iron, preferably with interior heating. If the clothes are lined, first use a brush soaked in five parts of the mixture and 100 parts of alcohol (50°) and then use the iron. (2) In the case of garments made partly of leather or fur, these are put into a metal box heated to between 40 and 45° ; 5 cc. of the mixture for each cubic metre are put on paper at the bottom ; 20 minutes is needed for each cubic metre.

For the destruction of nits on the body hairs use the following ointment :—

Parasiticide mixture	2 cc.
Vaseline	8 gm.

A. G. B.

Blanchard (R.). **La lutte contre les poux. Instructions pour les soldats au front.**—*Ligue Sanitaire Française.* (L. S. F.). 1915. Feb. 20. Bull. No. 3. 8 pp.

A useful note on the various kinds of lice infesting man, the diseases they transmit, and the means of combating these parasites. With regard to head-lice lotions of camphorated alcohol, warm vinegar, either pure or containing 1 per 1,000 corrosive sublimate, pyrethrum powder, or petrol and benzol are all effective, but the treatment should be repeated after two or three days. The same treatment is to be employed for *P. pubis* and the use of grey ointment is condemned as it causes irritation of the genital region and soils the clothes.

With regard to body-lice it is necessary to free the clothes from the parasites and this is best effected by benzine, though fumigating with tobacco is also sufficient to kill them. The above mentioned lotions are also of use for the skin. Eucalyptus is said to be a very useful agent for the destruction of lice in clothes.

E. H.

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Note.—On direct application (not through agents or booksellers) any of the foregoing reprints or pamphlets will be sent on loan to any part of the world, the Bureau paying outward postage.

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LA NIPOLOGIA. Rivista Trimestrale di tutti gli Studi Scientifici sulla Prima Età con speciale riguardo alla Igiene della Prima Infanzia. Bolletino della Società di Nipiologia e degli Instituti Nipioigienici di Capua e di Napoli. (Fondatore-Direttore Prof. Dr. Ernesto CACACE.) 1915. Dec. 31. Vol. 1. No. 1–2. Napoli: Tip. Ed. A. Tocco. Via del Grande Archivio, 19. [Price L.5, abroad L.7.]

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[The parasites studied were *Aggregata eberthi* and *Diplocystis schneideri*. In the former parasite there are six chromosomes, which do not arise from the karyosome, in the sexual forms. Reduction occurs at the first division after fertilisation, and not during gametogenesis. In the Diplocystic gamont the vesicular karyosome gives rise to three chromosomes, and reduction division occurs immediately after fertilisation. [Those interested in cytology should consult the original.]

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[The author in 1895 stated that blackhead in turkeys was due to the so-called *Amoeba meleagridis*. The organism is rounded, containing nucleus and karyosome, and is said to occur in the connective tissue and lymph spaces of the mucosa and submucosa The chief lesions are in the caeca and liver.

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